OBSERVATION OF DIABETIC PATIENT ASSOCIATED WITH HYPERTENSION AT BIRDEM GENERAL HOSPITAL

AN INTERNSHIP REPORT

BY

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Submitted to the Department of Nutrition and Food Engineering in the partial fulfillment of B.Sc. in Nutrition and Food Engineering

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APPROVAL

This internship, **"Observation of Diabetic Patient Associated with Hypertension at BIRDEM General Hospital",** has been turned in by **MD THOUHIDUL ISLAM** to the Department of Nutrition and Food Engineering at Daffodil International University. It has been accepted as a partial fulfillment of the requirements for the degree of B.Sc. in Nutrition and Food Engineering and approved for its style and content.

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The internship was completed under the supervision of **Arifa Sultana, Lecturer**, Department of NFE at Daffodil International University. I also affirm that neither this project nor any portion of this project has been submitted elsewhere for the purpose of earning a degree or certificate.

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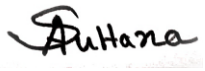

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I am really grateful and wish my profound indebtedness to **Arifa Sultana**, **Lecturer**, Department of Nutrition and Food Engineering, Daffodil International University. Her endless patience ,scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior drafts and correcting them at all stages have made it possible to complete this project.

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EXECUTIVE SUMMARY

The Birdem General Hospital in Dhaka, Bangladesh, is a well-known medical center. It has been around since 1984 and is now one of the best places for health care in the area. The hospital deals in many different types of medical care, such as cardiology, neurology, oncology, orthopedics, pediatrics, and many different types of surgery. Birdem General Hospital is committed to providing its patients with high-quality medical care. It has state-of-the-art equipment and a staff of highly skilled medical workers. The hospital focuses on the patient and tries to give caring support while upholding the greatest standards of medical care and moral behavior. The hospital's dedication to excellence goes beyond medical care; it also takes part in research, education, and projects that help the community. Birdem General Hospital is a trusted organization that is always coming up with new ideas and focusing on better healthcare delivery. Its goal is to improve the health of its patients and the community as a whole.

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CHAPTER 1

INTRODUCTION

1.1 Background

Diabetes mellitus encompasses a range of medical diseases that affect the body's ability to use blood glucose, also known as blood sugar. Glucose is an essential source of energy for the cells that make up muscles and tissues. Moreover, it functions as a substantial fuel supply for the brain. The cause of diabetes mellitus varies based on the individual type. Diabetes mellitus is marked by high levels of glucose in the blood (hyperglycemia), along with symptoms including extreme thirst (polydipsia) and heightened appetite (polyphagia). The prevalence of patients diagnosed with DM is witnessing a large and continuing growth on a daily basis. The prevalence of diabetes mellitus (DM) had a substantial increase, surging from 108 million cases in 1980 to 422 million cases in 2014, within a period of 34 years. The World Health Organization (WHO) predicts that diabetes will rank as the sixth leading cause of death by 2030. Diabetes is a chronic and consequential medical disorder marked by insufficient insulin secretion from the pancreas or impaired insulin utilization by the body, leading to the disruption of blood glucose levels. The presence of increased levels of glucose in the bloodstream, often observed in individuals with poorly managed diabetes, can lead to significant detrimental effects on various organs and systems including the cardiovascular system, blood vessels, ocular structures, renal function, and peripheral nerves. There are more than 400 million people worldwide who have diabetes. I have reached this destination. The prevalence of diabetes in the adult population aged 18 years and above has observed a large climb, escalating from 4.7% during the period of 1980 to 2014 to 8.5% in recent times. China exhibits the greatest prevalence of diabetes among a lot of nations, with over 116 million persons impacted by this ailment. India is positioned at the 77th rank on the list. The prevention of diabetes is now not achievable; but its control can be achieved by the adoption of a healthy lifestyle. There exist three basic classifications of diabetes. There are three basic forms of diabetes: type 1 diabetes, type 2 diabetes, and gestational diabetes. While a definite treatment for diabetes remains elusive, the management of this condition can be achieved by the adoption of a health-conscious lifestyle. In order to maintain a healthy lifestyle, it is important to quit some behaviors.

On the other hand**,** Hypertension, or high blood pressure, is a condition where the force of blood against the artery walls is consistently too high. Often referred to as a "silent killer," hypertension is a major risk factor for cardiovascular diseases, strokes, and other health complications. Similar to diabetes, hypertension poses a significant health burden in Bangladesh and globally.

1.2 Connection between diabetes and hypertension

Diabetes and hypertension are frequently interrelated. Individuals with diabetes are more prone to developing hypertension due to various factors, including insulin resistance, obesity, and kidney dysfunction. Conversely, having hypertension can increase the risk of complications in individuals with diabetes, leading to cardiovascular diseases, kidney problems, and diabetic retinopathy.

1.3 Bangladesh context

In Bangladesh, both diabetes and hypertension have become increasingly prevalent, posing significant challenges to the healthcare system. Urbanization, changing dietary habits, sedentary lifestyles, and an aging population contribute to the rising incidence of these conditions. Moreover, the coexistence of diabetes and hypertension in many individuals accentuates the need for integrated healthcare approaches and tailored interventions to manage these chronic diseases effectively.

1.4 Origin of the report

Daffodil International University is widely acknowledged as a prestigious institution of higher education. The Department of Nutrition & Food Engineering maintains a major role within this university. An internship is mandatory in order to obtain a bachelor's degree in this specific field of study. Students commonly perform this job after finishing all theoretical education. Therefore, it is recommended for students who are studying Nutrition & Food Engineering to choose a reputable organisation that is associated with our academic programme. The site in question could be a medical facility or educational institution, where a thorough understanding of the subject matter is necessary to obtain a recognised certification or degree. I have chosen BIRDEM General Hospital as the institution for my internship programme because I have a strong desire to pursue a career in the hospital sector. To yet, my experience in this sector is limited to the completion of a theoretical course. Consequently, I now lack practical knowledge on the topic matter, suggesting a gap in practical comprehension. This internship offers a chance to fill the current void. The topic matter of the internship report pertains to the management of dietary behaviours for patients diagnosed with diabetes. The main objective of this undertaking is to create a rapport with patients and closely observe their approach to treatment. Furthermore, I participate in dialogues with clients to collect data regarding their physical health, dietary patterns, and any particular dietary restrictions they may possess. The completion of this report acts as an essential condition for acquiring a bachelor's degree.

CHAPTER 2

INTERNSHIP OVERVIEW

2.1 BIRDEM General Hospital

The Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine, and Metabolic Disorders (BIRDEM) is a prestigious institution located in Shahbagh, Dhaka, Bangladesh. The Diabetes Association of Bangladesh owns and administers it as a comprehensive 600-bed general hospital. The hospital, first opened in 1980 on government-owned land, got financial support from Bangladesh. It currently resides in three large multi-story towers. The hospital is housed in a 15-story structure and now has 542 beds, 80 of which are specially devoted to destitute diabetic patients and are provided free of charge. BIRDEM's outpatient clinic (OPD) serves an average of 3,000 patients every day. There is no other hospital in Bangladesh that serves such a large number of diabetic patients. In compliance with the Social Registration Act of 1860, the non-profit, voluntary social health service known as BADAS was legally registered with the Department of Social Services. The organisation is governed by the National Council (NC), which consists of 32 members. The Life Members category is represented by 18 members on this council, while the Affiliates category is represented by 6 individuals. The individuals in question are elected through a direct voting process in which the voters are either life members or representatives from affiliated organisations. The Life Membership category has six members, accounting for one-third of the entire membership. On an annual rotational basis, two members depart from linked associations. These roles are elected during the Association's Annual General Meeting (AGM). Elected members are involved in the process of selecting officers for the National Council. The President, three Vice Presidents, the Executive Director, the Treasurer, the Co-Treasurer, and the Joint Treasurer are among the officers. Research is carried out in partnership with a number of national and international research institutions. Professor Mohammad Ibrahim (1911-1989), the acclaimed founder of BIRDEM, displayed a great commitment to his charitable endeavours, particularly in the field of social work, with a particular emphasis on the rehabilitation of patients within the community. He first considered the possibility of tackling diabetes in this country in the mid-1950s. He was well aware that diabetes is a disorder for which there is no clear cure. Nonetheless, the individuals involved are capable of leading useful and dignified lives. He saw the issue as a challenge in the field of social medicine. Despite the lack of thorough statistics on diabetes prevalence in the country, the individual in question displayed foresight into the situation and then mobilised a group of social workers, philanthropists, and specialists. On February 28, 1956, he founded the Diabetes Association of Bangladesh (previously known as East Pakistan) with their help. The Chief Executive Officer of BIRDEM serves as Executive Director and reports to a Board of Directors selected by the National Council of the Bangladesh Diabetes Association.

2.2 Mission and vision

2.2.1 Mission

The Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine, and Metabolic Disorders (BIRDEM) General Hospital has a primary mission to address the healthcare needs of individuals dealing with diabetes, endocrine, and metabolic disorders. It aims to provide comprehensive medical care, research facilities, and educational services related to these conditions. BIRDEM General Hospital focuses on:

1. Patient Treatment: Providing management, diagnosis, and specialized treatment for metabolic, endocrine, and diabetes disorders. The aforementioned encompass therapeutic interventions, diagnostic services, and medical consultations.

2. Research: Undertaking investigations to further the collective comprehension of metabolic, endocrine, and diabetes disorders; pursuing novel therapeutic approaches; and making contributions to the international body of knowledge in these domains.

3. Education and Training: Offering educational and training initiatives to healthcare professionals, students, and the general public with the aim of increasing knowledge, enhancing preventive measures, and improving the standard of care pertaining to these conditions.

4. Community Outreach: Participating in community programs and initiatives that aim to foster health consciousness, advocate for preventive measures, and offer assistance to individuals impacted by metabolic, endocrine, and diabetes disorders.

In general, the hospital endeavors to enhance the well-being of individuals grappling with these health issues through the provision of comprehensive care, the promotion of medical understanding, and the empowerment of communities and individuals through outreach and education initiatives.

2.2.2 Vision

Individuals with diabetes must not be subjected to malnourishment, a lack of medical treatment, or unemployment in Bangladesh, assuring their well-being and access to vital resources. All folks will be able to receive medical treatment at a reasonable cost.

2.3 Services

BIRDEM is a medical facility that offers complimentary diabetic treatment to all patients who are registered with the clinic. The clinic encompasses various sectors, including emergency patient care, indoor patient services, outdoor patient services, laboratory services, BIRDEM library, and BIRDEM academy. Patients also have the opportunity to have consultations with medical professionals, access to prescribed medications, receive nutritional guidance, and for those who are hospitalized, they are provided with a tailored meal plan based on their specific medical condition. BIRDEM also offers affordable medication to its patients at a minimal expense. The healthcare facility offers a range of additional services, including regular ward accommodations, private cabins, intensive care units (ICU), cardiac care units (CCU), high dependency units (HDU), operating theatres for post-operative care, radiography and imaging services, as well as specialized emergency care for surgical and medical cases.

2.4 Work and activities

I have gained experience in both indoor and outdoor industries. However, my primary focus was on visiting indoor wards and cabins. I encountered a diverse range of patients during my clinical experience, including those diagnosed with diabetes and hypertension who also presented with comorbidities such as chronic kidney disease (CKD), cardiovascular conditions, ocular disorders, lower extremity complications, and electrolyte imbalances. For my internship, I focused on the dietary management of individuals with diabetes and hypertension. During my visits, I engaged in discussions with the patients regarding their dietary intake, assessed their current nutritional status, inquired about any dietary restrictions, and gathered information on their family history and job experiences. Upon engaging in conversation with the individuals and carefully examining their dietary records, I have gained insight into their predicament. Consequently, I am able to formulate a personalized dietary plan that aligns with their specific caloric requirements.

2.5 Objectives

General Objective:

The primary objective of engaging in hospital work is to meet the departmental requirement for the successful completion of my bachelor's degree. The acquisition of knowledge in this field would be impeded without the opportunity to participate in an internship. In order to pursue a career in the clinical sector, it is imperative for me to acquire extensive expertise in this field. Participating in this endeavor provided me with a valuable opportunity to delve into my personal experiences. Through my experience in the medical setting, I have acquired practical knowledge that was previously absent in my repertoire.

Specific Objective:

- To get further knowledge on the operational activities within the health industry.
- To augment one's practical expertise, it is imperative to engage in hospital-based work experiences.
- To gain a comprehensive understanding of the typical signs and symptoms associated with diabetes and hypertension.
- To acquire extensive knowledge regarding a nutritional diet chart based on individual compilations, one must engage in a comprehensive learning process.
- To acquire knowledge regarding the issues faced by patients and to determine the appropriate beginning measures for their effective management.

CHAPTER 3

CLINICAL CONDITIONS

3.1 Diabetes mellitus and hypertension

Diabetes mellitus and hypertension represent two prevalent chronic conditions with substantial implications for individual health and healthcare systems worldwide. The convergence of these conditions, often observed in clinical settings, presents a complex clinical scenario that poses significant challenges in patient management and necessitates a deeper understanding of their interrelationship. This literature review critically examines an intern's report detailing observations on diabetic patients associated with hypertension, aiming to elucidate the complexities, implications, and clinical insights derived from this comorbidity.

3.2 Prevalence and clinical significance

Co-Prevalence Rates: The coexistence of diabetes and hypertension is a widely acknowledged phenomenon, with epidemiological studies consistently reporting a strikingly high prevalence of hypertension among individuals diagnosed with diabetes. Estimates suggest that a significant proportion, ranging from 60% to 80%, of diabetic patients concurrently present with hypertension. This high comorbidity rate underscores the significance and frequent concurrence of these conditions.

Impact on Health Outcomes: The amalgamation of diabetes and hypertension substantially escalates the risk of macrovascular and microvascular complications, substantially impairing health outcomes. Individuals afflicted with both conditions face an elevated risk of cardiovascular diseases, renal complications, retinopathy, neuropathy, and cerebrovascular events compared to those with singular diagnoses. Moreover, the convergence of diabetes and hypertension exerts a formidable burden on healthcare systems, resulting in increased morbidity, mortality, and healthcare costs.

3.3 Pathophysiology and shared mechanisms

Underlying Pathophysiological Factors: The intricate pathophysiological underpinnings linking diabetes and hypertension involve shared mechanisms, notably insulin resistance and neurohormonal activation. Insulin resistance, a cardinal feature of type 2 diabetes, not only contributes to abnormal glucose metabolism but also influences blood vessel function, predisposing individuals to elevated blood pressure.

Neurohormonal Dysregulation: Dysregulated neurohormonal systems, prominently the renin-angiotensin-aldosterone system (RAAS), significantly contribute to the pathogenesis of hypertension and exacerbate diabetic complications. Overactivation of RAAS induces vasoconstriction, sodium retention, and adverse vascular changes, perpetuating a cycle of aggravation for both conditions.

3.4 Impact on Health Outcomes

The convergence of diabetes and hypertension significantly heightens the risk of macrovascular and microvascular complications, exerting detrimental effects on health outcomes. Individuals affected by both conditions face an increased susceptibility to a spectrum of complications, including but not limited to:

Cardiovascular Diseases: Coexisting diabetes and hypertension amplify the risk of coronary artery disease, myocardial infarction, stroke, and peripheral arterial disease, contributing to elevated cardiovascular morbidity and mortality rates.

Renal Complications: The comorbidity of diabetes and hypertension escalates the risk of chronic kidney disease (CKD), nephropathy, and end-stage renal disease (ESRD), necessitating meticulous monitoring and management strategies to preserve renal function.

Ocular Complications: Diabetic retinopathy, compounded by the presence of hypertension, poses a heightened risk of vision impairment and blindness, emphasizing the need for vigilant ophthalmological assessments.

Neurological Sequelae: The combined impact of diabetes and hypertension increases the likelihood of neurological complications, including peripheral neuropathy and cerebrovascular events, further amplifying the disease burden on affected individuals.

3.5 Healthcare Burden

Beyond the individual health implications, the coexistence of diabetes and hypertension exerts a substantial burden on healthcare systems. The elevated prevalence rates and the resultant increased risk of complications necessitate extensive healthcare resources, including frequent monitoring, specialized interventions, and multidisciplinary care. This convergence substantially contributes to rising healthcare costs and resource allocation challenges, further emphasizing the significance of addressing this comorbidity.

CHAPTER 4

PATHOLOGY, EPIDEMIOLOGY AND MANAGEMENT

4.1 Pathophysiology and shared mechanisms

- **Underlying Pathophysiological Factors:** The interrelationship between diabetes and hypertension stems from shared pathophysiological mechanisms, contributing to their frequent coexistence and mutual exacerbation.

- **Insulin Resistance and Hypertension:**

1. **Insulin Resistance:** Central to the pathogenesis of type 2 diabetes, insulin resistance leads to impaired glucose uptake by peripheral tissues. Notably, insulin resistance also plays a pivotal role in the development and maintenance of hypertension. The association between insulin resistance and elevated blood pressure is attributed to impaired insulin signaling pathways affecting vascular endothelial function, leading to increased peripheral vascular resistance and sodium retention.
2. **Vascular Dysfunction:** Insulin resistance, accompanied by endothelial dysfunction, alters vascular homeostasis, promoting vasoconstriction and impairing vasodilation mechanisms. These vascular alterations contribute to increased systemic vascular resistance, elevating blood pressure levels.

- **Neurohormonal Dysregulation:**

1. **Renin-Angiotensin-Aldosterone System (RAAS):** Dysregulation of the RAAS significantly contributes to the pathophysiology of hypertension and exacerbates diabetic complications. In diabetes, hyperglycemia triggers RAAS activation, leading to increased angiotensin II production and subsequent vasoconstriction, sodium retention, and aldosterone release. These effects collectively raise blood pressure levels and contribute to the progression of hypertension.
2. **Sympathetic Nervous System Activation:** Increased sympathetic nervous system activity is a common feature in both diabetes and hypertension. Sympathetic hyperactivity results in enhanced vasoconstriction, increased heart rate, and sodium retention, amplifying blood pressure elevation and promoting cardiovascular complications.

- **Shared Inflammatory and Oxidative Stress Pathways:**

1. **Chronic Inflammation:** Chronic low-grade inflammation is a common denominator in diabetes and hypertension. Inflammatory mediators, such as cytokines and adhesion molecules, contribute to endothelial dysfunction, further perpetuating vascular abnormalities and increasing susceptibility to hypertension-related complications.
2. **Oxidative Stress:** Heightened oxidative stress, characterized by an imbalance between reactive oxygen species and antioxidant defenses, contributes to endothelial dysfunction, vascular remodeling, and insulin resistance, fostering a

milieu conducive to the development and progression of both diabetes and hypertension.

4.2 Clinical Observations and Challenges

Blood Pressure Control: Effective blood pressure management in diabetic patients with hypertension poses a significant clinical challenge. Striving for lower blood pressure targets (<130/80 mmHg) to reduce cardiovascular risk while avoiding hypotension and medication side effects requires meticulous monitoring and individualized treatment strategies.

Medication Selection: The selection of antihypertensive medications in diabetic individuals necessitates careful consideration due to potential interactions with glucose metabolism and cardiovascular outcomes. Tailoring medication regimens to optimize blood pressure control without compromising glycemic control is essential.

4.3 Diabetes Mellitus

Micronutrient Supplementation Studies exploring the impact of micronutrient supplementation on diabetes management in Bangladesh have investigated the role of specific nutrients:

1. **Vitamin D Supplementation:** Several trials have suggested a potential link between Vitamin D deficiency and insulin resistance. Studies like demonstrated improved insulin sensitivity and glycemic control in individuals receiving Vitamin D supplementation. However, inconsistencies in results across different studies warrant further investigation.
2. **Magnesium and Chromium Supplementation:** Limited evidence exists regarding the direct impact of magnesium and chromium supplementation on glycemic control and lipid profiles among individuals with diabetes in Bangladesh. Studies have shown mixed outcomes, with some indicating modest improvements while others report negligible effects on glucose levels.

Dietary Modification Programs Nutritional interventions encompass broader dietary modifications:

- **Promotion of Healthier Diets:** Initiatives encouraging reduced sugar intake, increased consumption of whole grains, fiber-rich foods, and balanced diets have been implemented. These programs aim to prevent and manage diabetes by addressing nutritional deficiencies and promoting healthier dietary patterns. However, their effectiveness at a national level remains uncertain due to implementation challenges and varying dietary preferences.

4.3.1 Signs and Symptoms of Diabetes

- Feeling excessive thirsty.
- Unexplained weight loss.
- Excessive hunger.

- Blurred vision
- Frequent urination, including frequent full diapers in infants and bedwetting in children.
- Fatigue
- Slow healing of cuts and sores,
- Vaginal yeast infection.

4.3.2 Complication of Diabetics

Short-Term Complications:

1. **Hypoglycemia:** Occurs when blood sugar levels drop too low. Symptoms include shakiness, confusion, sweating, and, in severe cases, loss of consciousness. It's often a side effect of certain diabetes medications or insulin therapy.
2. **Hyperglycemia:** High blood sugar levels can lead to symptoms like increased thirst, frequent urination, fatigue, and blurred vision. If not managed promptly, it can progress to diabetic ketoacidosis (DKA) or hyperosmolar hyperglycemic state (HHS), which are life-threatening conditions.

Long-Term Complications:

1. **Cardiovascular Diseases:** Diabetes significantly increases the risk of heart disease, stroke, and other cardiovascular conditions due to factors such as high blood pressure, high cholesterol levels, and damage to blood vessels.
2. **Neuropathy:** High blood sugar damages nerves, leading to diabetic neuropathy. It can cause numbness, tingling, or pain in the hands and feet and affect various body systems, leading to digestive, urinary, or sexual issues.
3. **Nephropathy:** Diabetes can damage the kidneys over time, leading to diabetic nephropathy. It may result in kidney failure or irreversible damage, causing difficulties in filtering waste from the blood.
4. **Retinopathy:** High blood sugar levels can damage the blood vessels in the eyes, leading to diabetic retinopathy. It's a leading cause of blindness in adults and affects the retina, leading to vision impairment or loss.
5. **Foot Complications:** Diabetes can cause nerve damage and poor blood flow to the feet, increasing the risk of infections and slow healing of wounds. Severe cases might lead to amputation if infections become uncontrollable.
6. **Skin Conditions:** People with diabetes are more prone to skin conditions, including bacterial and fungal infections, due to compromised immunity and poor wound healing.

Psychological Complications:

1. **Depression and Anxiety:** Managing diabetes can be emotionally challenging, leading to mental health issues such as depression and anxiety.

Proper management of blood sugar levels through medication, a healthy diet, regular exercise, and consistent medical care can significantly reduce the risk and impact of these complications. Regular check-ups and adherence to the prescribed treatment plan are crucial in preventing and managing these complications associated with diabetes.

4.4 Hypertension

Sodium Reduction Initiatives Bangladesh has initiated campaigns to reduce sodium intake:

- **Awareness Campaigns:** Public health campaigns aim to educate the population about the health risks associated with excessive sodium consumption. Efforts advocate for reducing salt intake and adopting alternative potassium-enriched salts. While these initiatives have raised awareness, their impact on reducing hypertension prevalence requires extensive evaluation.

Potassium and Magnesium Supplementation Studies investigating the efficacy of potassium and magnesium supplementation in managing hypertension in Bangladesh are limited:

- **Potential Impact:** Some evidence suggests that potassium and magnesium supplements might contribute to modest reductions in blood pressure among hypertensive individuals. However, comprehensive studies to validate these findings within the Bangladeshi context are lacking, hampering the implementation of targeted supplementation strategies.

4.4.1 Signs and Symptoms of Hypertension

Hypertension, often referred to as high blood pressure, is often asymptomatic in its early stages. However, some individuals might experience:

1. **Headaches:** Persistent headaches, particularly at the back of the head, can be a symptom of hypertension.
2. **Dizziness or Lightheadedness:** Feeling dizzy or lightheaded, especially when standing up quickly, can occasionally be associated with high blood pressure.
3. **Blurred Vision:** Hypertension can affect blood vessels in the eyes, causing vision changes or blurred vision in some cases.
4. **Shortness of Breath:** Difficulty breathing or shortness of breath can occur in severe cases of high blood pressure.
5. **Chest Pain:** While chest pain isn't a common symptom of hypertension, extremely high blood pressure can sometimes lead to chest discomfort or pain.
6. **Fatigue:** Feeling unusually tired or experiencing fatigue without obvious reasons could be a symptom, though it's not specific to hypertension alone.
7. **Irregular Heartbeat:** Palpitations or irregular heartbeats might occur in some individuals with significantly elevated blood pressure levels.

Most individuals with hypertension do not experience noticeable symptoms until blood pressure reaches dangerously high levels. That's why regular blood pressure checks during

routine medical appointments are crucial for early detection and management. High blood pressure is often referred to as a "silent killer" because it can cause damage to various organs in the body without presenting noticeable symptoms, emphasizing the importance of regular screenings and monitoring for early intervention.

4.4.2 Complication of Hypertension

In the event that hypertension is not treated or controlled properly, it can result in a number of severe problems that can impact a variety of organs and systems throughout the body. There are a number of serious issues that are connected with consistently high blood pressure, including the following:

Cardiovascular Complications:

1. **Heart Disease:** High blood pressure can strain the heart, leading to various conditions such as coronary artery disease, enlarged left heart (left ventricular hypertrophy), and eventually heart failure.
2. **Stroke:** Uncontrolled hypertension increases the risk of stroke by damaging blood vessels in the brain or causing blood clots that obstruct blood flow to the brain.
3. **Heart Attack:** Hypertension contributes to atherosclerosis (narrowing of arteries due to plaque buildup), increasing the risk of heart attacks.

Kidney Complications:

1. **Chronic Kidney Disease (CKD):** Hypertension can damage the blood vessels in the kidneys, affecting their ability to filter waste from the blood. Over time, this can lead to chronic kidney disease or kidney failure.
2. **Kidney Scarring (Nephrosclerosis):** Prolonged high blood pressure can cause scarring or hardening of the kidney's arteries, reducing their function.

Eye Complications:

1. **Retinopathy:** High blood pressure can damage the blood vessels in the retina, leading to retinopathy. This condition can result in vision impairment or even blindness if left untreated.

Vascular Complications:

1. **Aneurysms:** Persistent high blood pressure can weaken blood vessel walls, leading to the formation of aneurysms, which are bulges in blood vessels. Aneurysms pose a risk of rupturing and causing severe internal bleeding.
2. **Peripheral Artery Disease (PAD):** Hypertension contributes to the narrowing of blood vessels in the legs, reducing blood flow and leading to peripheral artery disease. This condition can cause leg pain, ulcers, and, in severe cases, tissue damage or amputation.

Cognitive Complications:

1. **Dementia:** Long-term uncontrolled hypertension can contribute to cognitive decline and an increased risk of vascular dementia or Alzheimer's disease.

Others:

1. **Sexual Dysfunction:** Hypertension might contribute to erectile dysfunction in men and reduced sexual desire or arousal in women.
2. **Metabolic Syndrome:** Hypertension is often associated with metabolic syndrome, a cluster of conditions including obesity, high blood sugar, and abnormal cholesterol levels, increasing the risk of diabetes and heart disease.

4.5 Effectiveness and Challenges

The literature lacks comprehensive studies assessing the direct impact of specific supplementation strategies on diabetes and hypertension outcomes in Bangladesh. Long-term, large-scale trials are crucial to ascertain the efficacy and sustainability of these interventions.

4.6 Challenges in Implementation

Several challenges hinder the successful implementation of nutritional supplementation programs:

- **Limited Access:** Rural areas often lack access to specialized supplements crucial for effective disease management.
- **Healthcare Disparities:** Discrepancies in healthcare availability and affordability between urban and rural areas affect program reach.
- **Affordability Concerns:** Financial constraints limit access to specialized nutritional supplements among vulnerable populations.
- **Low Health Literacy:** Limited understanding of the importance and proper use of supplements further impedes program effectiveness.

CHAPTER 5

CONCLUSION

5.Conclsusion

The observations detailed in the intern's report align with existing literature, emphasizing the complex interplay between diabetes and hypertension. The high prevalence rates, shared pathophysiological mechanisms, and clinical challenges underscore the critical need for integrated and patient-centered approaches to managing this comorbidity. Tailored treatment strategies, lifestyle modifications, regular monitoring, and multidisciplinary care are crucial for mitigating risks and improving outcomes in individuals with diabetes associated with hypertension. Proper management of hypertension through lifestyle modifications, medication adherence, and regular monitoring is crucial in preventing these complications. Early detection and effective treatment of high blood pressure significantly reduce the risk of developing severe complications associated with hypertension. Regular check-ups and lifestyle adjustments play a crucial role in preventing and managing these complications.

APPENDICES

Appendix 1: Observation data

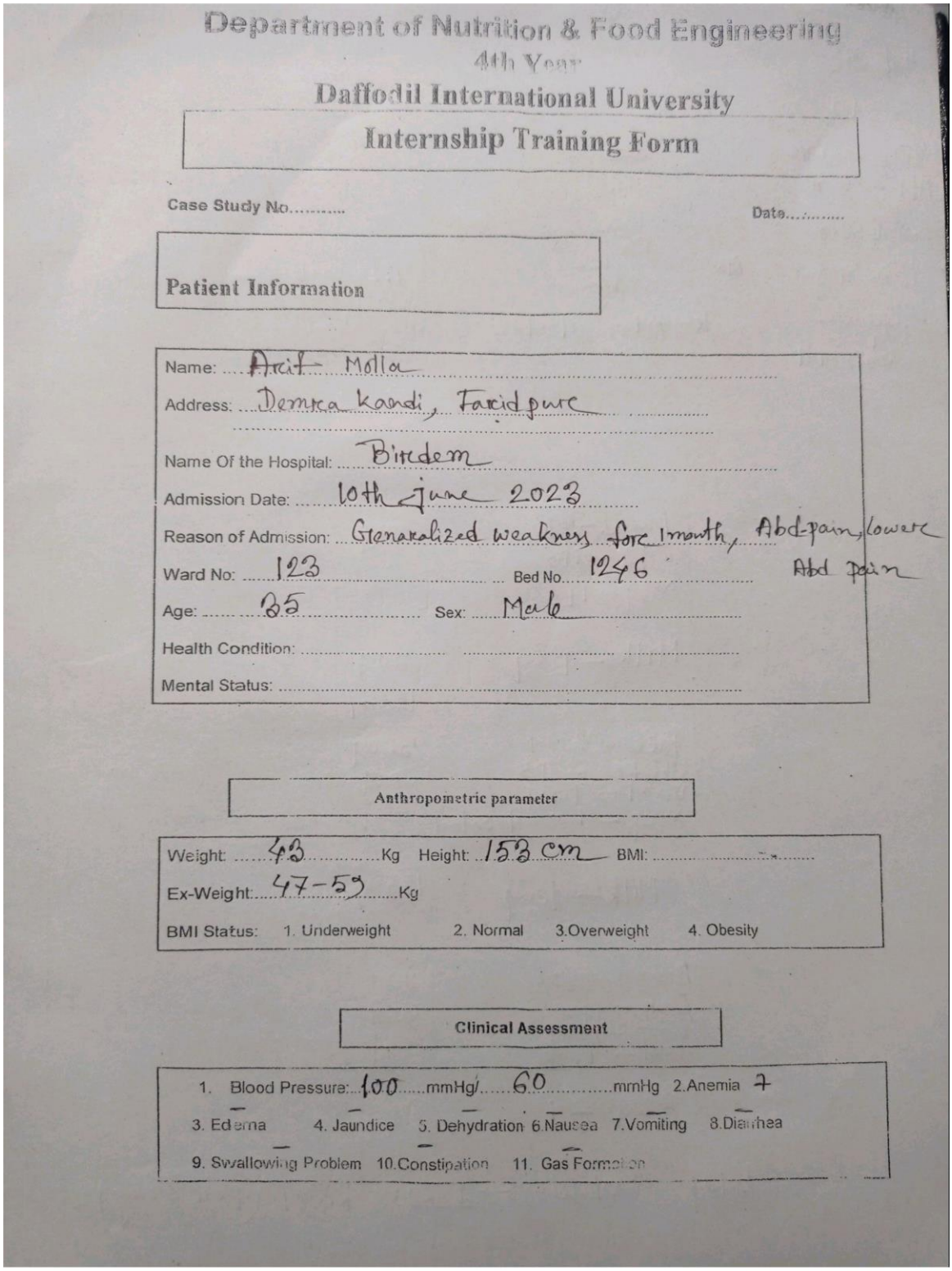
The data includes information about patients, such as their gender, age, blood pressure, diabetes status (DM), and hypertension status (HTN).

SL NO	Patient ward bed no	Gender	Age	pressure	DM	HTN
1.	W 143 B 1450	F	63	160/100	20	
2.	C 1522	M	50	130/90	12	
3.	W143 B 1439	F	35	110/60	2	
4.	W143 B 1457	F	37	110/70	3	
5.	W143 B 1442	F	55	130/80	10	
6.	W131 B 1314	M	46	100/60	6	3
7.	W101 B 1011	M	46	120/80	15	
8.	W131 B 1323	M	66	140/80	25	15
9.	W143 B 1452	F	62	165/80	20	10
10.	W143 B 1449	F	48	130/70	15	
11.	W143 B 1454	F	48	110/70	14	8
12.	W143 B 1457	F	77	130/70	30	
13.	W143 B 1452	F	70	140/90	27	20
14.	W143 B 1445	F	55	180/90	13	
15.	W143 B 1447	F	70	160/100	30	
16.	W143 B 1454	F	37	120/70	5	
17.	W143 B 1439	F	64	120/80	10	12
18.	W143 B 1444	F	45	90/60	9	
19.	W123 B 1230	M	53	120/90	13	
20.	W123 B 1227	M	58	110/80	22	
21.	W123B 1238	M	60	130/80	18	12
22.	W123 B 1244	M	30	120/80	5	2
23.	W123 B 1246	M	35	100/60	2	
24.	W123 B 1229	M	70	130/70	3	1
25.	W132 B 1327	M	62	110/60	6	8
26.	W132 B 1328	M	43	140/80	9	6
27.	W132 B 1334	M	35	160/90	8	
28.	W102 B 1022	F	50	120/70	16	
29.	W102 B 1021	F	38	160/90	5	
30.	W101 B 1011	M	35	125/80	1	
31.	W101 B 1014	M	90	130/80	25	
32.	W 101 B 1018	M	80	90/60	33	29
33.	W 133 B 1343	F	65	140/90	17	
34.	W 133 B 1340	F	40	140/90	2	3
35.	W132 B 1330	M	55	130/70	9	3
36.	W133 B 1344	F	57	160/80	14	11

37.	W133 B 1347	F	23	80/60	1	
38.	W121 B 1219	F	50	110/70	11	
39.	W121 B 1213	F	52	160/70	14	
40.	W121 B 1224	F	51	120/80	7	
41.	W121 B 1218	F	55	110/70	3	
42.	W113 B 1136	M	48	130/80	15	
43.	W113 B 1137	M	33	120/70	15	
44.	W113 B 1140	M	60	120/70	8	
45.	W113 B 1138	M	45	120/60	23	1
46.	W113 B 1141	M	45	100/60	35	
47.	C 1518	F	52	100/70	12	
48.	C 1519	M	62	130/70	26	
49.	W82 B 823	F	80	110/70	15	15
50.	W82 B 821	F	60	140/90	25	20
51.	W82 B 820	F	57	160/100	15	7

Appendix 2: Case studies

Case study 01



Department of Nutrition & Food Engineering
4th Year
Daffodil International University

Internship Training Form

Case Study No..... Date.....

Patient Information

Name: Arif Molla
Address: Demra kandi, Faridpure
Name Of the Hospital: Birdem
Admission Date: 10th June 2023
Reason of Admission: Generalized weakness, fore 1 month, Abd-pain, lower Abd pain
Ward No: 123 Bed No. 1246
Age: 35 Sex: Male
Health Condition:
Mental Status:

Anthropometric parameter

Weight: 43 Kg Height: 153 cm BMI:
Ex-Weight: 47-59 Kg
BMI Status: 1. Underweight 2. Normal 3.Overweight 4. Obesity

Clinical Assessment

1. Blood Pressure: 100 mmHg/ 60 mmHg 2.Anemia –
3. Edema – 4. Jaundice – 5. Dehydration – 6.Nausea – 7.Vomiting – 8.Diarrhea –
9. Swallowing Problem – 10.Constipation – 11. Gas Formation –

Chol - 96
CO_2 - 19
AST - 32 i.u/L
ALT - 24 "
S. Bili - 0.5
TCO_2 - 19
Triglyceride
65 mg/dl

Lab/ Biochemical Test

- Blood Glucoses(F) ..... mmol/dl
- Blood Glucoses..... mmol/dl
- HbAlc..... %
- Albumin 22.0 mg/dl
- Prealbumin..... g/dl
- Magnesium 0.8 mmol/l
- Calciurn 20 mmol/l
- Sodium 132 mmol/l
- TG 65 mg/dl
- Alk Phosphate 122 mmol/l
- Creatinine 1 mg/dl
- Others .....

k - 4.1 cl - 102

- Supplements Yes No
  Yes,
  Types,
  - Vitamin
  - Minerals Vitamins
- Drugs:

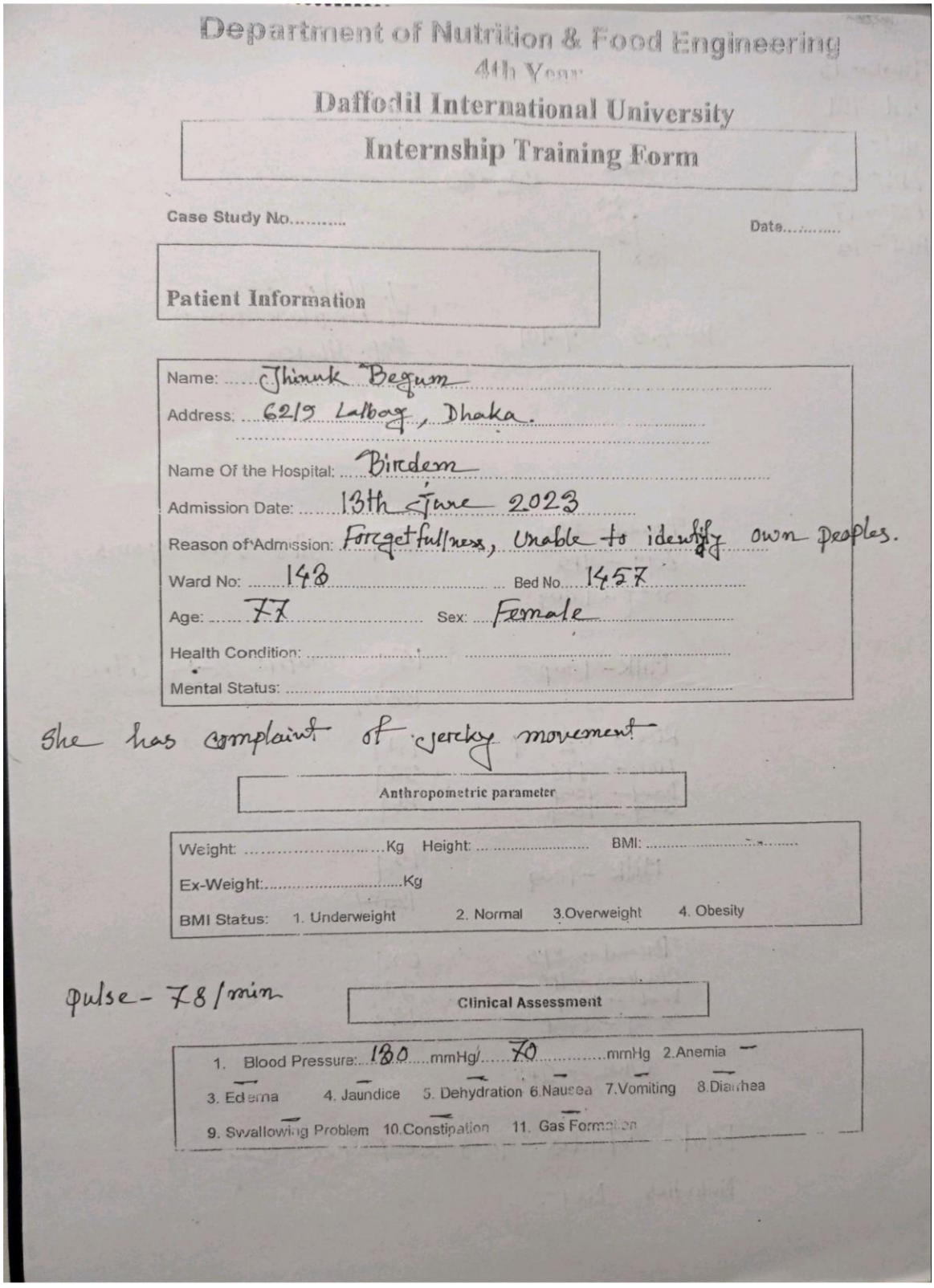
1. T. Empast -
2. T. Teracon
3. T. Sodicarb.

Whole Day Diet Plan

Meel Time	Food Time	No.Of Exchange	Description of Food
Breakfast	Bread - 3ps Egg - 1ps veg - 1ps	90g	
Mid-Morning Snacks	Milk - 1 cup	30g 125ml	
Lunch	Rice - 2 cup Chicken - 1ps Daal - 1 cup veg - 1 " + salad	260g 60g 20g	
Afternoon Snacks	Milk - 1 cup	125ml	
Dinner	Bread - 3ps Egg - 1ps veg - 1 cup Daal - 1 cup	90g 60g 20g	
Late Night Snacks	Bun - 1		

Total Calories - 1500 k.cal (per day)

Case study 02



Department of Nutrition & Food Engineering

4th Year

Daffodil International University

Internship Training Form

Case Study No..... Date.....

Patient Information

Name: Jhinuk Begum

Address: 6219 Lalbag, Dhaka.

Name Of the Hospital: Birdem

Admission Date: 13th June 2023

Reason of Admission: Forgetfullness, Unable to identify own peoples.

Ward No: 143 Bed No. 1457

Age: 77 Sex: Female

Health Condition:

Mental Status:

She has complaint of jercky movement

Anthropometric parameter

Weight: .....Kg Height: ..... BMI: .....

Ex-Weight:.....Kg

BMI Status: 1. Underweight 2. Normal 3.Overweight 4. Obesity

pulse- 78/min

Clinical Assessment

1. Blood Pressure: 130 mmHg/ 70 mmHg 2.Anemia –

3. Edema – 4. Jaundice – 5. Dehydration – 6.Nausea – 7.Vomiting – 8.Diarrhea –

9. Swallowing Problem – 10.Constipation – 11. Gas Formation –

Bun = 15
Chl - 121
HDL - 55
LDL - 49
AST - 17
ALT - 15

Lab/ Biochemical Test

- Blood Glucose(F) ..... mmol/dl
- Blood Glucoses..... mmol/dl
- HbAlc..... %
- Albumin 28.6 mg/dl
- Prealbumin..... g/dl
- Magnesium 0.8 mmol/l
- Calcium 8.9 mmol/l
- Sodium 134 mmol/l
- TG ..... 87 ..... mg/dl
- Phosphate ..... mmol/l
- Creatinine..... mg/dl
- Others .....

K - 4.5 Cl - 101

CO_2 - 23

- Supplements Yes No
  Yes,
  Types,
  - Vitamin
  - Minerals Vitamins
- Drugs:

1. T. Pladex (75mg)
2. T. Angilock (100mg)
3. Cap. Otherca

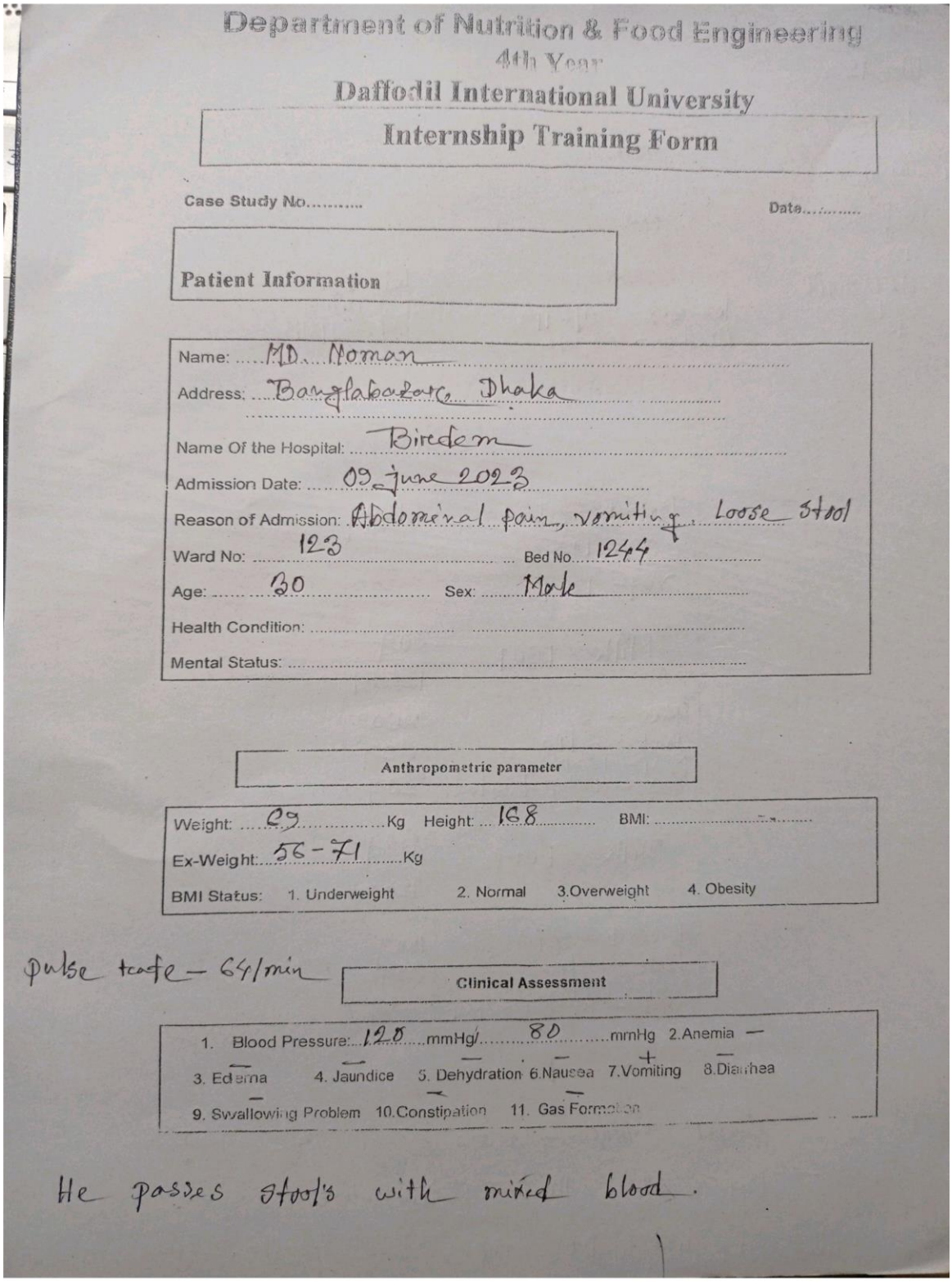
Whole Day Diet Plan

Meel Time	Food Time	No.Of Exchange	Description of Food
Breakfast	Bread - 2ps Egg - 1ps veg - 1 cup	60g	Oil: 3 tea spoons
Mid-Morning Snacks	Milk - 1 cup	15g 125ml	water 2 $\frac{1}{2}$ Liter
Lunch	Rice - 1 $\frac{1}{2}$ cup Fish - 1ps Daal - 1cup veg - 1cup	180g 30g 15g	
Afternoon Snacks	Milk - 1cup	15g 125ml	
Dinner	Bread - 2ps Chicken - 1ps Daal - 1cup veg - 1cup	60g 30g 15g	
Late Night Snacks	Bun - 1ps		

Total Calories 1200 k.cal per day

Diabetics Diet.

Case study 03



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Case Study No..... Date.....

Patient Information

Name: MD. Noman
Address: Banglabazar, Dhaka
Name Of the Hospital: Birdem
Admission Date: 09 June 2023
Reason of Admission: Abdominal pain, vomiting, Loose Stool
Ward No: 123 Bed No. 1244
Age: 30 Sex: Male
Health Condition:
Mental Status:

Anthropometric parameter

Weight: 69 Kg Height: 168 BMI:
Ex-Weight: 56-71 Kg
BMI Status: 1. Underweight 2. Normal 3.Overweight 4. Obesity

Pulse rate – 64/min

Clinical Assessment

1. Blood Pressure: 120 mmHg/ 80 mmHg 2.Anemia –
3. Edema – 4. Jaundice – 5. Dehydration – 6.Nausea – 7.Vomiting + 8.Diarrhea –
9. Swallowing Problem – 10.Constipation – 11. Gas Formation –

He passes stool's with mixed blood.

Total protein - 6.6

Hb - 12.8

TCO2 - 24

Bilirubin - 1.0

S. AST - (SGOT) 12

S-ALT (SGPT) 14

Lab/ Biochemical Test

- Blood Glucoses(F) ..... mmol/dl
- Blood Glucoses..... mmol/dl
- HbAlc..... %
- Albumin 40.9 mg/dl
- Prealbumin..... g/dl
- Magnesium..... mmol/l
- Calciurn ..... mmol/l
- Sodium... 147 ..... mmol/l
- TG ..... mg/dl
- Phosphate ..... mmol/l
- Creatinine... 0.8 ..... mg/dl
- Others .....

k - 3.7 Cl - 119

Amylase - 49 U/L

- Supplements Yes No
  Yes,
  Types,
  - Vitamin
  - Minerals Vitamins
- Drugs:

1. Inj. Ipenam (1g)
2. T. Metryl
3. Sup. Voltalin

Whole Day Diet Plan

Meel Time	Food Time	No.Of Exchange	Description of Food
Breakfast	Bread - 4 pcs Egg - 1 pcs Veg - 1 cup	120g	
Mid-Morning Snacks	Milk - 1 cup	30g 125ml	
Lunch	Rice - 3 cup Chicken - 1 pcs Daal - 1 cup Veg - 1 cup + salad	360g 60g 20g	
Afternoon Snacks	Milk - 1 cup	30g 125ml	
Dinner	Bread - 4 pcs Fish - 1 pcs Daal - 1 cup Veg - 1 cup + salad	120g 60g 20g	
Late Night Snacks	Bun - 1		

Total calories - 2000 kcal per day

Types of Diet : Diabetics

Also he has DM for few years.