Nur

by Ih Bh

Disease Process of Diabetes Mellitus

Student's Name

Institution

Course

Instructor

Date

Disease Process of Diabetes Mellitus

Globally, the incidence of various chronic diseases such as cancer, diabetes mellitus, hypertension and cardiovascular diseases is increasing. Healthcare professionals now meet more patients suffering from these diseases regularly than they used to. Diabetes mellitus, particularly, has become a common disease in most, if not all, healthcare facilities across the world today. Hence, it is vital for nurses and other healthcare professionals to have the most current knowledge on the disease processes of these common chronic disorders. Based on an actual patient, this paper discusses the disease process of diabetes mellitus, with the discussion divided into two main parts; the pathophysiology of the disease and the nursing process during management.

A Case of Actual Patient

I was assigned a diabetic patient on my first day of clinical rotations. The patient, whom I will name Hope, was thirteen years old and had primarily presented with recent bedwetting. This was the main reason for her parents to visit the facility. However, upon further assessment, she was found to have increased thirst, increased urination frequency, and a sweet fruity smell. Her parents also complained of unexplained weight loss despite an increase in her appetite. Based on her clinical features, I suspected diabetes mellitus, which was later confirmed after a series of blood glucose tests. She was then admitted for two days because of significantly elevated blood sugars and then discharged home the third day with medications.

Pathophysiology

Description of the Disease

Diabetes Mellitus commonly referred to as diabetes, is a common disease among children, adolescents, and adults. It is a chronic metabolic disease that is associated with

increased blood glucose levels (World Health Organization (WHO), 2020). More than often, the disease results from defects in insulin secretion, insulin action, or in some cases, a combination of both pathologies. Insulin is a metabolic hormone secreted by the beta cells of the pancreas (Ojha et al., 2019). It decreases glucose levels in the blood by promoting its transportation into cells, enhancing its metabolism for energy, and stimulating its storage in the liver and muscles (Ojha et al., 2019).

Epidemiology (A Significant Epidemic)

Recently, the prevalence of diabetes has increased rapidly compared to previous years. In 2019, the International Diabetes Federation (IDF) recently reported that about 460 million people had diabetes worldwide (Saeedi et al., 2019). This is a drastic increase compared to 1980, when only 180 million people had diabetes (WHO, 2020). Moreover, this number is expected to increase by twenty-five percent by 2030 and by fifty-one percent by the year 2045 (Saeedi et al., 2019). The rising cases of diabetes reflect how epidemic the disease is becoming throughout the world and thus the need to understand it and provide adequate care during management.

Related Factors (Primarily Age)

Based on various causative factors, diabetes is classified into several subtypes. The commonly known subtypes include type 1 and type 2 diabetes (WHO, 2020). Other diabetes types are gestational diabetes and diabetes due to other conditions (WHO, 2020). Type 1 diabetes commonly occurs during childhood and adolescent stage, with peak incidences occurring around the age of 10 and 14 years (Giwa et al., 2020). The disease, previously known as juvenile diabetes, involves an absolute deficiency of insulin resulting from defects in insulin secretion by beta cells (Giwa et al., 2020). Type 2 diabetes occurs commonly among middle-aged and older adults. Individuals of 45 years and above have an increased risk of developing type 2 diabetes

(WHO, 2020). However, due to the increasing adoption of a sedentary lifestyle and poor dietary habits, type 2 diabetes is increasingly occurring in children (WHO, 2020). Type 2 diabetes results from defects in insulin action caused by an increased insulin resistance by the body cells (Ojha et al., 2019). Thus, the body cannot utilize the insulin present in the blood despite normal secretion at the initial stages.

Etiology and Risk Factors for Diabetes

Although the exact cause of diabetes is unknown, the disease is associated with several predisposing factors that increase the risk of individuals developing diabetes. For type 1, major risk factors include genetics and environmental factors. According to recent studies, certain variants of genes contribute to the the risk of developing type 1 diabetes. Examples of the gene variants implicated in type 1 diabetes include HLA-DQA1, HLA-DRB1, and HLA-DQB1 (Giwa et al., 2020). At the same time, studies have shown various environmental factors such as infections, diet, gut microbiota, and vitamin D intake is beneficial in the development of type 1 diabetes (Giwa et al., 2020). These factors are among the triggers cause destruction of beta cells pancreatic beta causing insufficient insulin hormone secretion.

The major risk factors for type 2 diabetes include modifiable risks such as obesity, overweight, inactivity, and sedentary lifestyle (Ojha et al., 2019). These factors cause insulin resistance making the body cells unable to use the circulating insulin hormone in the blood (Ojha et al., 2019). After some time, the increasing insulin resistance causes pancreatic exhaustion and ultimately impaired secretion. Thus, in later stages, the disease may be characterized by simultaneous defects in insulin secretion and insulin action.

Clinical Manifestations

Initial clinical presentations of diabetes vary from one patient to another. However, the clinical features common to most diabetic patients include extreme hunger, fatigue, increased thirst, irritability, unexplained weight loss, and frequent urination (WHO, 2020). In advanced stages of the disease, a patient may present with complications such as vision changes, blurriness, numbness, and tingling sensations on the extremities (Giwa et al., 2020). Other patients may present with recurrent infections and chronic leg ulcers. In the case of this patient, the initial presentation was bedwetting, hence showing the need to be vigilant when assessing for diabetes.

Physiological changes, systemic changes, and Disease Progression

The initial physiological change caused by diabetes is the disruption of carbohydrate, protein and lipid metabolism, which essentially depend on insulin. The elevation of blood glucose levels past the normal limit of 140mg/dl is a result for insulin deficiency (Giwa et al., 2020). The kidneys are forced to work extra during filtering and reabsorption due to the excess amount of glucose. As time progresses, excess glucose is excreted in the urine because the kidneys are exhausted. (Giwa et al., 2020). Ultimately, the excess glucose in urine results into dehydration which is a result of osmotic diuresis that is characterized by increased thirst feeling. As aa result, the patient develops increased urge to drinking fluids and frequent urination.

If not lowered, the excess glucose damages several structures in the human body, including nerves and blood vessels. For the eyes, excess glucose damages to the retina, retinal vessels, as well as the optic nerve can result in blurriness and ultimately blindness (Papatheodorou et al., 2018). Since Hope's disease was diagnosed early, her retinal examination was normal. Moreover, the excess glucose cause an interference in the oxygen supply and ability of the nerves to detect and send signals leading to diabetic neuropathy (Papatheodorou et al.,

2018). Damages to the kidneys, renal vessels, and other associated renal structures result in diabetic nephropathy, reducing the patient's quality of life and life expectancy. Similarly, damage to large vessels can result in cardiovascular diseases such as stroke and cardiac arrest and chronic leg ulcers due to venous insufficiency. Thus, major systems affected by diabetes include the endocrine, cardiovascular, and nervous systems.

Usual Treatment

Management of diabetes requires a multidisciplinary approach involving all parties, including the patient, parents, nurses, and physicians. The usual treatment for type 1 diabetes involves the injection of exogenous insulin (Giwa et al., 2020). My patient was given 0.3 units of insulin per body weight. The total dosage was divided into two, with two-thirds given in the morning and a third in the evening. Treatment of type 2 diabetes usually starts with lifestyle changes and dietary modification before advancing to oral glucose-lowering agents such as metformin and glibenclamide (Ojha et al., 2019). However, this will depend on the severity of the disease at the time of diagnosis. In advanced stages, patients may be given a combination of anti-diabetic medications and insulin depending on the blood sugar targets.

Prognosis

If managed well, individuals with diabetes can lead a productive life in society. According to recent data, well-controlled glucose levels reduce the incidence of acute and chronic complications for more than 10 to 30 years (Berg, 2018). For instance, since she started treatment, Hope has never presented with any complications because we have ensured her monthly A1C remains below 7.5%. However, if left untreated, diabetes can result in several complications, including ketoacidosis, diabetic nephropathy, diabetic neuropathy, and diabetic retinopathy (Berg, 2018). Macrovascular and microvascular complications reduce life

expectancy by more than 10 to 20 years if blood glucose levels are left uncontrolled (Berg, 2018). Thus, to ensure Hope lives a long life, we have to tightly control her blood glucose levels by ensuring she adheres to insulin medication and dietary changes.

Nursing Process

Accurate and Up-to-date nursing information is essential for appropriate interventions and management of diabetic patients. The nursing care process starts with patient assessment, formulation of nursing diagnoses, developing a relevant plan, appropriate interventions, and evaluation to see if the treatment goals are being achieved. The process is described in detail below.

Assessment

The nursing care process usually starts with assessing the patient to ensure they have diabetes and any other disease. The process involves assessing the patient's history of diabetes symptoms, blood glucose tests, and lifestyle risk factors such as excessive weight and sedentary life (Nikitara et al., 2019). Other factors that should be assessed include cultural, social, and psychological factors (Nikitara et al., 2019). I assessed how the symptoms affect the patient's quality of life, including their impacts on everyday activities of life such as schooling. Furthermore, I assessed her crucial signs, including blood pressure, pulse rate, weight, respiratory rates and height. I then examined the patient's skin, hands, feet, and eyes to assess for any complication of the disease. A full examination of the nervous and cardiovascular systems is essential to rule out complications and other associated risk factors. The last part of the assessment involves doing laboratory tests to assess blood glucose levels. Some of the tests include random blood sugar test, glucose intolerance test, lipid profile, urinalysis, renal function

tests, and electrocardiogram. Hope's fasting blood sugar was 200 mg/dl, which was too high despite showing no features of complications.

Diagnoses

      Patients with diabetes often present with several nursing diagnoses. For this patient, two physiological nursing diagnoses that were apparent after thorough assessment included unstable glucose level and disturbed sleep pattern. Because of diabetes, blood glucose levels can increase to dangerous levels. Her blood glucose levels were significantly elevated, leading to hospital admission for two days. Because of the increased intake of fluids, she experienced an increased frequency of urination to the extent of wetting her bed. This disturbed her sleeping patterns because she had to wake up often to visit the bathroom or after every bedwetting episode. One of the psychosocial diagnoses for this case included deficient knowledge, as the parents were unfamiliar with the common symptoms of diabetes. Despite the patient having increased thirst and frequent urination, they did not know they were of much concern. The act of bedwetting at thirteen years caused psychological stress to both the patient and her parents. Thus, fear and depression were some of the psychosocial nursing diagnoses identified.

Planning

      After a thorough assessment, the initial management plan was to lower the glucose levels to below 140mg/dl. Later on, I planned to address factors that can lead to dangerous blood glucose levels, reduce the risk for infections, teach the patient about the therapeutic regimen, including how to divide the insulin dosage, and screen for cardiovascular and neurovascular complications. The patient is currently on an annual screening checkup whereby the patient undergoes retinal, neurological, and foot examination. This plan aims to ensure the patient does not develop acute, sub-acute or chronic complications at any point in her life.

Interventions

Nursing interventions apply to all diabetic patients regardless of the subtype of the disease. For instance, some of the independent interventions carried out for the patient included general health education on diabetes, home glucose monitoring, triggering factors for glucose instability, and mode of action of anti-diabetics. The patient was also shown how to inject insulin and rotate injection sites to tissue lipohypertrophy. For dependent nursing interventions, I stressed the importance of adhering to the insulin dosage the physician had recommended. Currently, she is doing 0.3 units of insulin per body weight and responding well with the dosage.

Evaluation

The last step of the nursing care process involves assessing whether the treatment objectives are being met. It constitutes evaluating the patient's understanding of her condition, triggering factors for diabetic ketoacidosis, and regimen adherence (Nikitara et al., 2019). It also involves measuring blood glucose levels regularly to ensure it is within the normal range of 80mg/dl and 140mgl/dl. Currently, Hope's blood glucose levels are within the normal range for diabetic patients, and her monthly A1C is with the targets of less than 7.5%. Her last A1C was 5.6%, which means were are doing good in her management. She also understands that diabetes is a chronic disease, and she may end-up using insulin for the rest of her life.

<div align="center">

Conclusion

</div>

In brief, diabetes has become a common chronic disease in most healthcare settings. The health, social, and psychological burdens associated with it can be overwhelming to patients and their families. This prompts the need for healthcare workers, including nurses, to have a broad knowledge of the disease, its course, management guidelines, and prognosis. Moreover, knowing

the causative factors, pathophysiology, and diagnostic criteria for diabetes can help with early

detection, diagnosis, and treatment initiation among diabetic patients.

References

Berg, J. (2018). *Course and prognosis of diabetes*. Retrieved from Health 24:

https://www.news24.com/health24/Medical/Diabetes/Overview/course-and-prognosis-of-

diabetes-20180803

Giwa, A. M., Ahmed, R., Omidian, Z., Majety, N., Karakus, K. E., Omer, S. M., ... & Hamad, A.

R. A. (2020). Current understandings of the pathogenesis of type 1 diabetes: genetics to

environment. *World journal of diabetes*, *11*(1), 13. mellitus. *J diabetes metab*, *6*(5), 1-9.

Nikitara, M., Constantinou, C. S., Andreou, E., & Diomidous, M. (2019). The role of nurses and

the facilitators and barriers in diabetes care: A mixed-methods systematic literature

review. *Behavioral Sciences*, *9*(6), 61.

Ojha, A., Ojha, U., Mohammed, R., Chandrashekar, A., & Ojha, H. (2019). Current perspective

on the role of insulin and glucagon in the pathogenesis and treatment of type 2 diabetes

mellitus. *Clinical pharmacology: advances and applications*, *11*, 57.

Papatheodorou, K., Banach, M., Bekiari, E., Rizzo, M., & Edmonds, M. (2018). Complications

of diabetes 2017.

Saeedi, P., Petersohn, I., Salpea, P., Malanda, B., Karuranga, S., Unwin, N., ... & IDF Diabetes

Atlas Committee. (2019). Global and regional diabetes prevalence estimates for 2019 and

projections for 2030 and 2045: Results from the International Diabetes Federation

Diabetes Atlas. *Diabetes research and clinical practice*, *157*, 107843.

World Health Organization. (2020). *Diabetes*. Retrieved from World Health Organization:

https://www.who.int/news-room/fact-sheets/detail/diabetes

Nur

PRIMARY SOURCES

1	**Submitted to Herzing University** Student Paper	**1**%
2	**Submitted to Napier University** Student Paper	**1**%
3	www.thieme-connect.com Internet Source	<**1**%
4	storage.googleapis.com Internet Source	<**1**%
5	www.lcsd.gov.hk Internet Source	<**1**%
6	journals.plos.org Internet Source	<**1**%
7	res.mdpi.com Internet Source	<**1**%
8	José Luis Pino, Verónica Mujica, Miguel Arredondo. "Effect of dietary supplementation with oat β-glucan for 3months in subjects with type 2 diabetes: A randomized, double-blind,	<**1**%

controlled clinical trial", Journal of Functional Foods, 2021

Publication

Exclude quotes	Off		Exclude matches	Off
Exclude bibliography	On			