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Diabetes Mellitus

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Diabetes Mellitus

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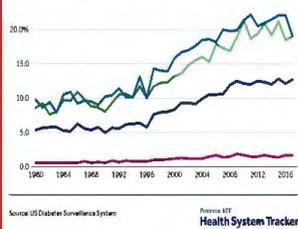
Introduction

The topic of this poster is Diabetes Mellitus. This topic was chosen because 415 million people live with diabetes worldwide, and an estimated 193 million people have undiagnosed diabetes (Chatterjee et al., 2017). This number is expected to rise to 625 million by 2045 (Forouhi & Wareham, 2019). Type 2 diabetes accounts for more than 90% of patients with diabetes and leads to microvascular and macrovascular complications that cause profound psychological and physical distress to both patients and providers, and put a huge burden on health-care systems (Chatterjee et al., 2017). Despite increasing knowledge of the disease process and treatment, the rate of diabetes keeps on climbing. Between 1980 and 2004, the global rise in obesity, sedentary lifestyles, and an aging population have quadrupled the prevalence of type 2 diabetes (Chatterjee et al., 2017).

With this type of sustained increasing prevalence, it is important for providers to be aware of the most current statistics and treatments. This is particularly true for providers who work with patients who suffer from food insecurity. Food insecurity is associated with higher HbA1c (Berkowitz et al., 2018). Therefore, it is crucial that providers be aware of the social determinants of health and how they relate back to the patients diagnosis.

This topic was chosen as this disease is silent, doing damage to vital organs and microvasculature long before the patient is aware of any symptoms. It is up to providers to be keen on screening and be well informed enough to provide thorough education to their patients.

Percent of total population with diagnosed diabetes, by age, 1980-2017
 — Ages 0-44 — Ages 45-64 — Ages 65-74 — Ages 75+



(Kamal et al., 2019)

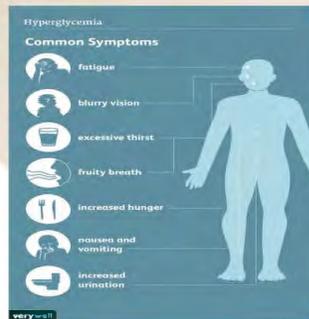
Signs and Symptoms

There are two main types of diabetes mellitus, type 1 and type 2. Type 1 diabetes generally has a rapid, acute onset and occurs in childhood, teenagers, or young adults. The rapid progression of Type 1 make it easier to identify and diagnose. Type 2 typically has a slower onset and occurs in middle age to older adults, making true onset of disease difficult to establish. With Type 2, there is usually a three to seven year period where blood sugar levels are elevated, yet the patient is not officially diagnosed. While there are differences between Type 1 and Type 2 diabetes, they do share common signs and symptoms (Forouhi & Wareham, 2019).

Common symptoms of diabetes:

- Urinating often
- Feeling extremely thirsty
- Feeling extremely hungry
- Extreme fatigue
- Blurry vision
- Cuts and bruises that are slow to heal
- Weight loss (Type 1)
- Tingling, pain, or numbness in the hands and feet (Type 2)
- Fruity odor to the breath (DKA)
- Ketones in urine (DKA)
- Vomiting (DKA)
- Children who are potty-trained might begin to have accidents

(American Diabetes Association, 2021)



(Cervoni, 2021)

Risk Factors

- Obesity
- Sedentary lifestyle
- High blood pressure
- High cholesterol
- Smoking
- Poor diet
- Lower educational status
- Processed meat
- Increased television watching

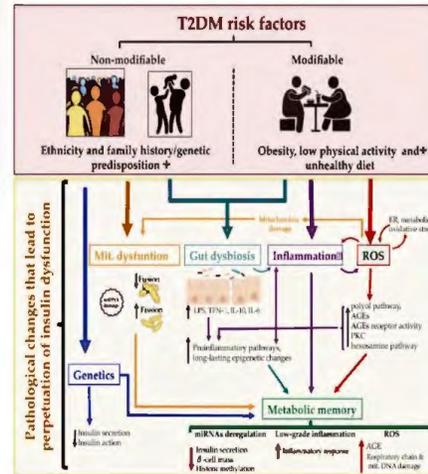
(Bellou et al., 2018)

Pathophysiology

The pathophysiology of diabetes generally begins with a malfunctioning in the feedback loop between insulin action and insulin secretion, which results in high glucose serum levels in the blood. Beta cells are cells which secrete insulin. In the case of beta cell dysfunction, insulin secretion is decreased, hindering the bodies ability to maintain optimal glucose levels for physiologic functioning. This is one way that diabetes can occur. Another way is through insulin resistance. This is where the body's cells do not respond normally to insulin. Insulin resistance leads increased glucose production in the liver and a decreased use of serum glucose by the muscles, liver and adipose tissue. Beta cell dysfunction typically tends to be more severe than insulin resistance, however, when both beta cell dysfunction and insulin resistance are present, hyperglycemia is increased, which leads to the progression of diabetes (Galicía-García et al., 2020).

Insulin secretion has to be finely structured to accurately meet metabolic demand. For that reason, proper islet (cluster of cells in the pancreas that secrete insulin) integrity must be preserved in order to allow beta cells to respond to the bodies metabolic needs. When pathologic conditions occur, the disease processes can cause disturbance of islet structure, fracturing communication channels between pancreatic islets, leading to dysregulation of insulin and an increased release of glucagon from the pancreas; eventually causing a sustained elevated blood glucose level. Any errors in the production of any of the insulin precursors, or of insulin itself, as well as any disorder in the secretion of insulin, can lead to insulin secretory dysfunction, the primary cause of beta cell failure, and the basis of diabetes (Galicía-García et al., 2020).

Insulin resistance refers to a decrease in the response of insulin responsive cell or, at a broader level, a lower response to circulating insulin by blood glucose levels. There are three broad categories of insulin resistance: diminished insulin secretion by beta cells, insulin antagonists in the blood, due either to counter-regulatory hormones or non-hormonal bodies that impair insulin receptors, and impaired insulin response in the bodies tissues (Galicía-García et al., 2020).



(Galicía-García et al., 2020)

Significance of Pathophysiology

Diabetes can lead to a multitude of other health issues due to the increased serum glucose levels. Cardiovascular disease is the major macrovascular complication seen. Diabetes increases the risk of death by cardiovascular disease three to four times more than a non diabetic. Diabetes also increases a patients chance of suffering from a stroke. Hyperglycemia also causes microvascular complications such as retinopathy, neuropathy, and nephropathy. These can lead to blindness, renal failure with the need for dialysis, and the loss of sensation in hands and feet. Other microvascular complications lead to decreased tissue perfusion and poor wound healing, which can often result in peripheral amputations (Chatterjee et al., 2017).

With such significant complications stemming from diabetes, providers understanding the pathophysiology behind the disease is of the utmost importance.

Implications for Nursing Care

There are many implications for nursing care when it comes to diabetes. At the fore front of this is education. The first line of defense against diabetes is education on how to prevent the disease. This includes:

- Maintaining a healthy diet
- Staying physically active
- Keeping a normal BMI (between 18.5 and 24.9)
- Informed on family history
- Smoking cessation
- Limiting alcohol intake
- Getting proper sleep

(Forouhi & Wareham, 2019).

For patients diagnosed with diabetes, education on proper management from their provider is crucial for preventing further complications from the disease.

This includes:

- Healthy coping
- Taking medications
- Glucose monitoring
- Reducing risk
- Problem solving
- Healthy eating
- Being active

(American Association of Diabetes Educators, 2021)

Conclusion

Diabetes can be a life changing and debilitating disease. Prevention, early diagnosis, and frequent education is key in helping patients avoid the many obtrusive complications that coincide with diabetes. Data shows that diabetes is highly prevalent, and will only continue to increase in the future (Forouhi & Wareham, 2019). Providers need to be actively screening at risk patients and starting early and aggressive treatment measures. While prevention is best, providers must be able to lead patient through a series of lifestyle and dietary changes.

References



Additional Sources

American Diabetes Association (2021). *Diabetes Symptoms*. <https://www.diabetes.org/diabetes/type-1/symptoms>

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