

Diabetes Mellitus Type 2

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Diabetes mellitus (DM) affects roughly 537 million people globally and is projected to impact 643 million people by the end of 2030 (Metta, 2023). The majority of these being people with DM type two. There are three classifications for diabetes mellitus: DM type one, DM type two, and gestational diabetes. DM type two is characterized by inadequate insulin secretion or insulin resistance which causes unstable blood glucose regulation. DM type two is the most prevalent and is also the most life-threatening due to its ability to have an effect throughout the entire body. There is a wide variety of modifiable and nonmodifiable risk factors that contribute to a person developing DM type two but luckily, many are preventable. This paper will discuss the pathophysiology of DM type two, contributing risk factors, community education related to prevention, and possible treatment options.

Statement of the Problem

DM type two is a multisystem disease that affects the pancreas, liver, muscle, and adipose tissue. It is indicated by the body's inability to secrete insulin adequately or as a resistance to insulin. Insulin is a hormone secreted into the bloodstream by beta cells in the Islets of Langerhans that are found within the pancreas. Insulin is continuously released in small amounts into the bloodstream in response to a person's blood glucose level, which is more commonly referred to as someone's "blood sugar." Insulin then acts as a transporter for glucose across the cell membrane which will ultimately lower a person's blood sugar. Regulating blood glucose levels is important because it is utilized in all cells throughout the body to make usable energy. DM type two can develop overtime as the beta cells become fatigued from overstimulation which causes a decrease in their ability to produce insulin. Therefore, they cannot adequately produce enough insulin to regulate glucose levels. Another way DM type two is developed is when the body's tissues no longer responds to insulin which leaves glucose

circulating in the bloodstream. This is known as insulin resistance because glucose is no longer entering the cells and is not being used to make energy. If the inadequate insulin secretion and/or insulin resistance is not managed properly then serious complications like diabetic retinopathy, atherosclerosis, diabetic neuropathy, shock, and death can occur. Internationally DM type two accounts for 1.6 million premature deaths with many resulting from cardiovascular complications (Cerillo & Prattichizzo, 2021);(Metta, 2023). The best way to treat DM type two is to prevent it from ever developing. Community education on the importance of screening at risk clients is critical. Over eight million people are undiagnosed in the U.S alone (Johnson, 2018). This affects the nursing community greatly as many at risk clients are hospitalized due to being undiagnosed and having unmanaged DM type two. These clients, along with ones that are diagnosed with DM type two, are then hospitalized for hyperglycemia, hypoglycemia and more severe conditions like HHS (hyperosmolar hyperglycemic syndrome). Therefore, hospitalization of DM type two is stressful to manage alone due to unstable blood glucose, but also an added stressor to the nursing community as they regularly have multiple complications as well. To decrease the number of preventable hospitalizations it is essential for the nursing community to educate on the importance of following a diabetic diet, increasing physical activity, and following personalized medication regimes.

Risk Reduction/Treatment of the Problem

Fortunately, DM type two has two major categories of risk factors: modifiable and nonmodifiable. Nonmodifiable risk factors are things that cannot be changed which include being over forty-five years old, having a family history of DM type two, and those with a Hispanic or African American heritage. The two most common modifiable risk factors are obesity and living a sedentary lifestyle. Due to that, it is critical to educate and have patients take

initiative and participate in their plan of care early. To promote weight loss, clients should follow a diabetic diet and increase their physical activity. Diabetic diets include food high in monounsaturated fats, whole grains, and foods that are low in carbohydrates. To further improve weight loss, physical activity is recommended, as it improves insulin sensitivity. This could include a brisk walk, swimming, or running, depending on client condition. Together diet and exercise are the best prevention for modifiable risk factors of DM type two. This is because as less adipose tissue surrounds the central organs an increase of insulin secretion and decrease resistance of it occurs, which is one of the causes of DM type two. On the other hand, for nonmodifiable risk factors it is important to get screened early. It is recommended for at risk adults to get screened at least every three years. Individuals with prediabetes, increasing hyperglycemia, or multiple risk factors should get screened annually (Johnson, 2018). Methods of screening include a hemoglobin A1C test which will reflect blood glucose over a period of two to three months, or a fasting blood glucose that is more sensitive and indicative of a single point of blood glucose at a time. Regular screening will in the end decrease the eight million people that are undiagnosed and could experience the wide range of complications previously discussed. Upon diagnosis clients will be expected to go through lifestyle modifications to regulate their blood glucose. The best way to regulate blood glucose in newly diagnosed clients is simply diet and exercise as mentioned previously. In some cases weight loss can be curative of DM type two (Johnson, 2018). If DM type two needs further regulation medicine will be utilized. Medications include Biguanides, which lower glucose production by the liver and a common one prescribed is Metformin. Another is Glyburide, this is classified as a Sulfonylureas as it stimulates release of insulin. In more severe cases DM type two may have to be managed with insulin. Clients will have to learn when to inject depending on the type they have. There are four

types of insulin: rapid acting, regular, intermediate, and long acting. Depending on which is prescribed, clients will have to adjust eating patterns and continuously monitor blood glucose for the rest of their lives.

Planning of Teaching Content

With all this information in mind, it is important to educate clients on the importance of prevention. To do this the learners will verbalize understanding of a preventative diet following decreased consumption of saturated fats and sugar. This can be measured by having the client keep a food diary to refer to. They will also be informed on the amount of physical activity they are expected to do and can tolerate weekly. This will be based on the client's body weight, age, and the amount of risk factors and complications they may have. Physical activity can be measured on smartphones, smart watches, activity journals and weight loss tracking sheets. To get the importance of prevention across to clients the utilization of statistics about the rates of complications and mortality will be used as they can be eye opening to learners. The use of handouts with dietary recommendations on them for people at risk will allow the learners to look back on what was taught and reinforce what they should be consuming. Along with a handout on dietary one can be made for physical activity listing local gyms, fitness clubs, fitness apps and more. By doing this reinforcement of preventative measures, lifestyle modifications will be easily accessible to refer to.

Conclusion

To summarize, DM type two is caused by either inadequate insulin secretion or insulin resistance. There are modifiable risk factors, obesity and sedentary lifestyle and nonmodifiable factors, being over the age of forty-five, familial history and ethnicity. Screening is important for

at risk clients to get done every three years. If clients show signs of prediabetes or hyperglycemia they need to get screened yearly. There are many complications that can arise from the disease including hypoglycemia, hyperglycemia, HHS and shock. The best way to prevent complications is to prevent the disease. To do this it is important for clients to understand the importance of balanced nutrition that is low in saturated fats and sugars and high in vegetables, whole grains, and fruits. Physical activity needs to be educated further because one in four adults do not participate in enough physical activity (Nojomi, et al., 2020). Teaching of prevention will be the main topic of discussion at the health fair. To do these demonstrations of snacks diabetic clients could eat will be shown, fruits and vegetables. Along with that examples of health tracking apps and community clubs will be presented to encourage increase in physical activity. By doing this, attendees will be able to spread the education to their family and friends and encourage Sussex County to learn more about diabetes type two prevention.

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