Diabetes Essay, Research Paper

Diabetes is a very grave and serious disease involving many hardships, but a good diet, exercise, and overall healthy habits can keep your diabetes under control which in-turn makes you feel better and avoid later complications.

Diabetes is a disease in which the body does not produce enough insulin, a hormone needed to convert the sugars and starches that we eat into energy needed for daily life. The cause of the disease is a mystery, but genetics and environment seem to play major roles. There are two kinds of Diabetes, Diabetes Insipidus and the more common Diabetes Mellitus. Diabetes Insipidus is a rare disease caused by a deficiency of vasopressin, a hormone of the posterior pituitary gland that controls the amount of urine secreted by the kidneys. It’s symptoms of extreme thirst and frequent urination can usually be stopped by injection or nasal inhalation of vasopressin. Diabetes Mellitus is a more severe and common disease affecting over five percent of the population of the United States, approximately 14 million people. Mellitus is caused by a defective carbohydrate metabolism. The islets of Lange Hans, granular cells in the human pancreas, secrete a hormone called insulin that facilitates the blood’s sugar glucose into all the tissues of the body. In diabetics the entry of glucose is impaired due to a deficiency in insulin or a blocking of its actions caused by altered receptor cells, the cells that carry the sugar from the blood into the tissue. So sugar builds up in the blood and is excreted in urine.

There are also two types of Diabetes Mellitus. They are Type I and Type II. Type I Diabetes is an autoimmune disease in which the body has a severe or total reduction in insulin production, most often occurring in children and young adults. The immune system attacks and destroys the beta cells in the pancreas called the islets of Lange Han that unlock the cells of the body allowing glucose to enter and fuel them. Since glucose cannot enter the cells it builds up in the blood and the body’s cells literally starve to death. Also since the body lacks sufficient energy from tissue glucose it begins to break down stored fat that produces ketenes, a byproduct of broken down fat, that makes the body’s blood acidic interfering with respiration. About 700,000 people in the United States have Type I diabetes. Its symptoms are unusual thirst, frequent urination, extreme hunger, dramatic weight loss, fatigue, and irritability. If the disease is undetected or not properly treated it can quickly become fatal. Death by diabetic coma was usually the outcome of the disease before insulin was discovered.

The other more common type of Diabetes is Type II, affecting more than 13.3 million people in the United States. Type II Diabetes is a metabolic disorder resulting from the body’s inability to make enough or properly use insulin. Sometimes Type II can be due to prolonged obesity when a rise in the level of blood sugar inactivates tissue components that are targets for insulin, consequentially killing off the cells needed to transport the sugar. Type II diabetes is most prevalent in adults over forty, but most people do not recognize the disease until they develop one of it’s life threatening complications. Type II has the same symptoms as Type I including frequent infections, blurred vision, slow healing cuts and bruises, and tingling or numbness in hands or feet. Type II diabetes can be treated with oral medications, but as the person gets older and insulin production declines they may be forced to take injections. Diabetes is a chronic disease that has no cure.

There are many grim and sobering facts about diabetes and its complications. Of the estimated fourteen million people in the United States with diabetes more than half are not aware of it yet. Every sixty seconds a person is diagnosed with diabetes. 650,000 people will be diagnosed this year. Diabetes is the fourth leading cause of death by disease in the US. More than 160,000 people will die from diabetes and its complications this year.

Many people first become aware of their diabetes when they develop one of its complications. Diabetes is the leading cause of blindness. It destroys vision by interfering with the function of the retina. The tiny blood vessels in the retina are weakened, break and start to leak blood into the eye that clouds vision. Most people who have diabetes for longer than ten years begin to develop retinopathy. About 30,000 people will go blind from diabetes this year.

Kidney disease is another complication of diabetes. Ten percent of all diabetics will develop kidney disease. Risk factors for nephropathy, damage to the kidneys, are high blood pressure and kidney and urinary tract infections. If a patient’s kidneys fail, a condition called the end stage renal disease, they will either have to undergo dialysis, a method of removing wastes from the blood, several times a week or have a kidney transplant in order to stay alive.

In addition to lack of control over blood sugar levels, many diabetics also have problems with high blood pressure, cholesterol, and fat levels. This combination leads to angioplasty, or disease of the blood vessels. Very small blood vessels, both veins and arteries, become thick and weak. Larger blood vessels start developing arterioscleroses, clogging with fat and blood clots, slowing the flow of blood. If the clots break loose and travel to the brain, a stroke can occur. If the clogged blood vessel supplies the heart, a heart attack can occur when blood circulation is interrupted. People with diabetes are two to four times more likely to have a heart attack then normal people. More than 77,000 diabetics die annually due to heart disease. Diabetics are also five times more likely to suffer a stroke, with more than 11,000 deaths annually.

Impaired blood flow means poor circulation. Poor circulation compounded with neuropathy, nerve damage caused by diabetes can cause a cut to become infected before it is even noticed. If circulation is cut off from any part of the body too long, or if an infection is left to fester, the part becomes gangrenous and must be amputated. Diabetes is the leading cause of non-traumatic lower limb amputations. The risk of leg amputations is 27.7 times greater for a person with diabetes. Each year, 54,000 people lose their foot or leg to diabetes.

Diabetes is not only a very tragic disease health wise but is also very costly. Health care and related costs for treatment, as well as the cost of lost productivity, run nearly $92 billion annually.

Many major advancements have been made in therapy for diabetics since its earlier days that make the disease easier to live with. To control diabetes you must control blood sugar levels, keeping them as close too normal as possible. Normal blood sugar levels are between 80 and 120 mg/dl. One advancement is the Self Blood Glucose Monitor, which allows you to check the amount of blood sugar level with just one drop of blood. This replaced Urine sugar testing because it is easier and more accurate. Blood glucose testing eliminates the confusion caused by varying kidney threshold levels. Different people spill sugar into their urine at different blood sugar levels. A person with a 300-mg/dl blood sugar level could have the same reading on the test strip as someone with a 120-mg/dl blood sugar.

Sometimes how you feel is a good indication of what your blood sugar level is. If you have a stomachache or difficulty breathing your sugar is very high, over 400. If you have no energy, feel groggy and tired your blood sugar is most likely between 200-400. From 80-200 you should be fine and have no abnormal feelings. When you experience extreme hunger, sweating or shakiness you probably have a low blood sugar, between 20-60.

Blood sugar ideally should be tested 4 to 6 times daily, before meals and approximately two hours after. This will allow you to see the whole pattern of how your body responds to diet, exercise, and insulin.

A broader, more long ranged, blood sugar test is the Hemoglobin A1c. Hemoglobin is the protein in the red blood cells that carries oxygen to various parts of the body. If the blood sugar is high, sugar attaches to the hemoglobin and remains there for the life of the red blood cell (2 to 3 months). They call hemoglobin with sugar-attached hemoglobin A1c, thus reflecting how often blood sugars have been high for the past 2 to 3 months. Normal values of hemoglobin A1c for a non-diabetic person are 4 to 6 %, while an acceptable level for a diabetic would be anything below 10.4 %.

Before insulin was developed in 1921, there was little hope for people with Type I Diabetes. Most insulin used today is genetically engineered replacing the old purified pork insulin. There are two major types of insulin, short acting regular and long acting NPH. Regular insulin begins to act within a half hour after being injected. It has a peak effect 1 to 4 hours after the injection and lasts up to 6 hours. NPH, neutral protamine hagedorn, insulin is made with a protein that allows it to be used slowly. NPH has its peak activity 6 to 12 hours after injection, and is usually gone in 18 to 24 hours.

Most people take two injections of insulin per day, a half hour before breakfast and dinner. The time between the injection and the eating of the meal can be varied according to the pre-meal blood sugar test results. Insulin can be adjusted to how hungry you are or the kind

Of food being eaten (Foods high in sugar and carbohydrates require more insulin to break down). Another insulin therapy is to only take shots of regular insulin to cover what you eat. This will result in tighter blood sugar control if done correctly, but can be inconvenient and bothersome because at least four injections would have to be administered daily. Type II diabetics do not need injections of insulin. Type II diabetics can control their blood sugars by taking oral hypoglycemic which helps the pancreas to make more insulin.

Diet also plays a big role in the health of many diabetics. More than half of adult diabetics manage their diabetes with diet rather than insulin or oral hypoglycemic agents.

Carbohydrates are an important part of a diabetic’s diet. There are two types of carbohydrates, simple and complex. Simple carbohydrates include sugar, candies, pastries and cakes, which usually raise blood sugar levels very rapidly. Complex carbohydrates include vegetables, dried beans and peas, grains breads and cereals that raise your blood sugar level gradually over a long period of time. Complex carbohydrates also contain more nutrients minerals and fiber than do simple carbohydrates, but simple carbohydrates can give blood sugar a quick lift to stave off the affects of a low blood sugar.

Diabetics must also limit their intake of cholesterol, fat, and salt. These foods are all linked to heart disease. This may mean the cutting out or limiting the consumption of eggs, dairy foods and red meat.

Special consideration must be given to planning medications, mealtimes and exercise so that wide swings in blood sugar levels are avoided. An insulin dependent diabetic should plan to eat foods high in carbohydrates at a time that coincides with the peak effectiveness of their insulin.

The one factor that has countless significant positive effects on the health of diabetics is exercise. Exercise causes the muscles and other tissues to need more calories, especially sugar, in order to do their work. Glucose, sugar, is the body’s main source of energy. It is stored in the liver and muscles as glycogen, which is quickly exhausted during exercise. Muscles then absorb glucose from the blood stream thus lowering blood sugar levels. Exercise lowers blood sugar by increasing the number of special carrier proteins in the cell membrane that regulate the movement of glucose from the blood into the muscle. It makes these cells more receptive to insulin raising the body’s insulin sensitivity, which allows the person to decrease the amount of insulin they are taking. Sometimes blood sugar can be lowered for hour’s even days after just one strenuous exercise session. In non-diabetic people, their blood insulin level drops during exercise. Less insulin means that low blood sugar will not occur to deprive the brain of its thinking capacity and the muscles of their maximum potential use. With low insulin levels, not as much sugar goes into some cells and the liver makes more sugar for immediate use instead of storing it. In insulin dependent diabetics the body does not as perfectly adjust the blood sugar level. The blood insulin level may drop down because the insulin level is not determined by secretion from the pancreas but the amount, type, and rate at which the insulin is absorbed. Diabetics must reduce the amount of insulin taken if they are planning to exercise to avoid a low blood sugar. Out of control diabetics, with blood sugars ranging from 200 to 250, should not exercise, because short bursts of intense exercise may actually raise their blood sugar.

Exercise is also very helpful in a diabetics’ weight control. Excess weight can cause the insulin carrier cells from doing their job, which will result in high blood sugars. Also most overweight people have high cholesterol, blood pressure, and triglycerides that lead to heart disease. In the case of Type II diabetes exercise and weight loss are key. Many patients reduce or even discontinue medication all together. Because of the exercise, the little amount of insulin their pancreas does make is enough to keep them at a normal blood sugar level. And since obesity is an element in the cause of Type II diabetes exercise is actually a form of prevention. At the University of California at Berkley researchers found that for every 500 cal you burn a week in activity your risk of diabetes drops 6 %.

“Physical benefits aside, diabetes is a complex and frustrating chronic illness. It takes a great deal of time and energy to manage, and can leave a victim feeling run-down, helpless or depressed. The psychological benefits of exercise cannot be understated the sense of energy, control, and accomplishment that exercise provides can really make a difference in a persons quality of life.”

Researchers are learning more and more every day about the causes of diabetes and looking for ways to prevent the disease or its complications. While still other research is aimed at perfecting methods of administering insulin and monitoring blood sugar levels. Immune suppressing drugs are being studied as one way to stop the immune system from attacking beta cells, which would prevent diabetes. Also the transplantation of a whole pancreas or just beta cells to make insulin has a promising future. But until they find a miracle cure or perfect the transplants, millions of people can still control their diabetes, hassle and pain free, by just exercising, eating a healthy diet, and keeping up with their medication therapy.