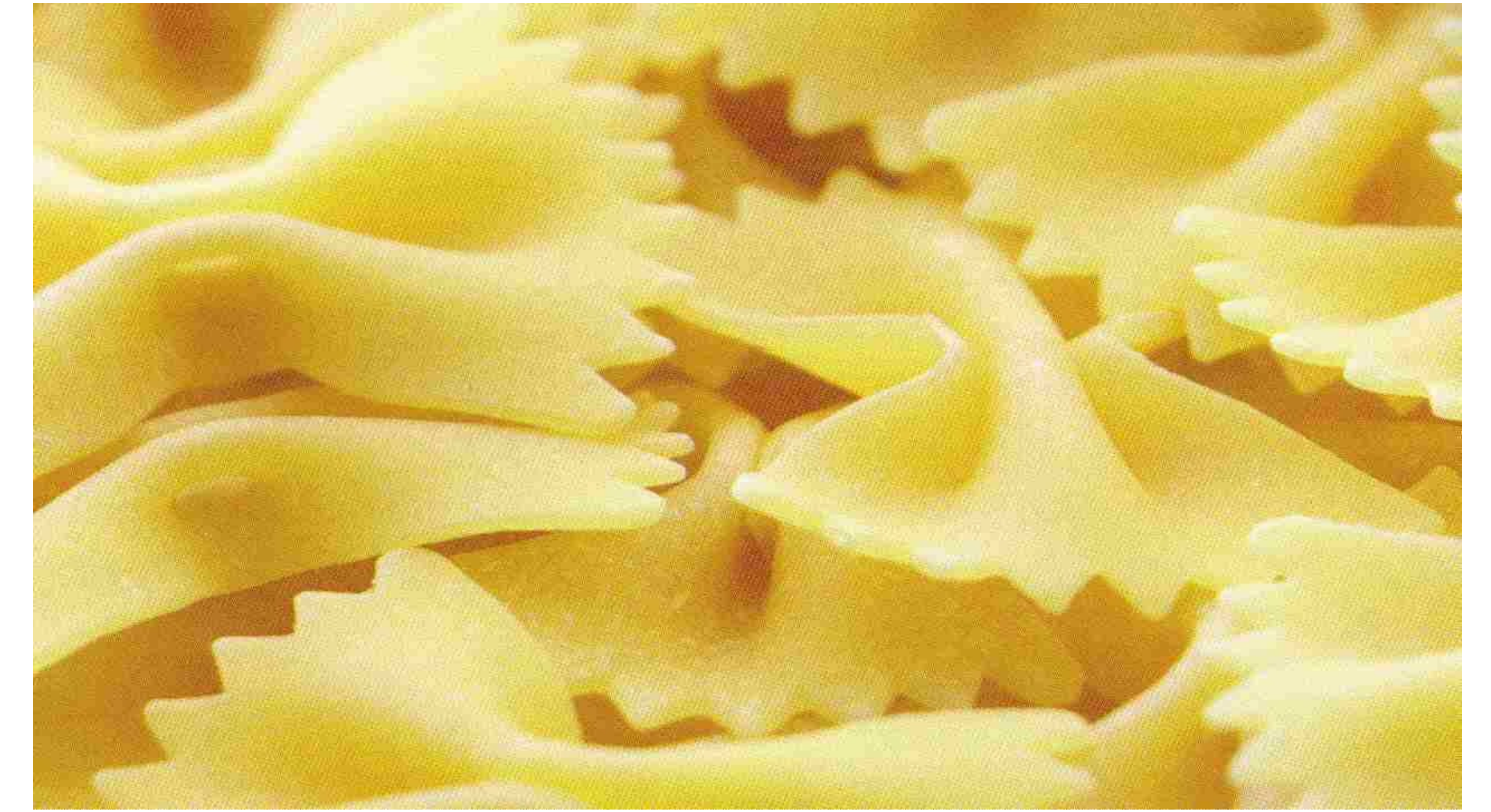




How to Maintain Your Blood Sugar Level

Low Blood Sugar can occur to anyone

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Abstract:

Although low blood glucose levels generally only affect those individuals with diabetes, if the average person's blood glucose (sugar) level drops below 60 mg/dL s/he would experience a dangerously low blood sugar level, also known as hypoglycemia (HG). Consequences of this include shakiness, dizziness, sweating, hunger, headache, pale skin color, sudden moodiness or behavior changes, clumsy or jerky movements, seizure, difficulty paying attention, confusion, and tingling sensations around the mouth. If his/her blood glucose level drops below 50 mg/dL, it is thought that brain function will be affected as well. Consuming a diet of 5 small meals per day that contain protein and carbohydrates from foods such as eggs, meat, and whole grain breads, reduces this risk of HG 50% for diabetics and 75% for others. If those individuals are college athletes and they consume high levels of carbohydrates before and during intense physical activity lasting longer than 60 minutes, their chances of experiencing low blood sugar levels are lowered by about 57%. Through personal experience and consultation with a nutritionist, I have found that these recommendations are correct and are likely to benefit most individuals.

Introduction:

Many people are unaware that they are at risk for experiencing low blood sugar levels, also known as hypoglycemia (HG). Those who are not diabetic are often unconcerned about the risk of low blood glucose levels; however, everyone, despite their health conditions, should be aware of HG and its causes and symptoms as well as how to treat it. **Symptoms** of HG include shakiness, dizziness, sweating, hunger, headache, pale skin color, sudden moodiness or behavior changes, clumsy or jerky movements, seizure, difficulty paying attention, confusion, and tingling sensations around the mouth.

While low blood sugar normally only happens to diabetic individuals, if a non-diabetic person does not consume at least 50 mg of protein and carbohydrates on a regular basis, preferably from natural sources, they could be at risk for their blood glucose levels to drop below 60 mg/dL. The average person's fasting blood glucose levels, usually taken after not consuming any foods or beverages for at least eight hours or overnight, is lower than 100 mg/dL. The highest blood glucose levels should occur shortly following a large meal or sugary beverage and should not be higher than 200 mg/dL. My hypothesis states that I can find simple guidelines for people to avoid HG under circumstances encountered by college students.

Method:

I was able to ascertain my information about blood sugar levels by reading and researching a variety of peer-reviewed articles, case studies, and a personal interview with a nutritionist.

Table 1: A Suggested Diet for Diabetic Individuals for One Day

Meal	Recommended Food & Drink
Breakfast	1 medium fresh orange 1 slice banana bread 1 cup Skim milk Butter (if desired)- used sparingly
A.M. snack	1 medium apple 2 Tablespoons peanut butter 5 whole wheat crackers
Lunch	Medium mixed-green salad 1-2 tablespoons vinaigrette dressing (if desired) ½ cup dry whole wheat pasta (=1 cup cooked) 1 cup tomato sauce 1 cup cubed melon
P.M. snack	1 cup low fat yogurt ½ granola
Dinner	1 cup dry Spanish Rice 1 medium chicken breast ½ cup pineapple rings 1 cup fresh (raw) baby spinach 1-2 tablespoons vinaigrette dressing (if desired)

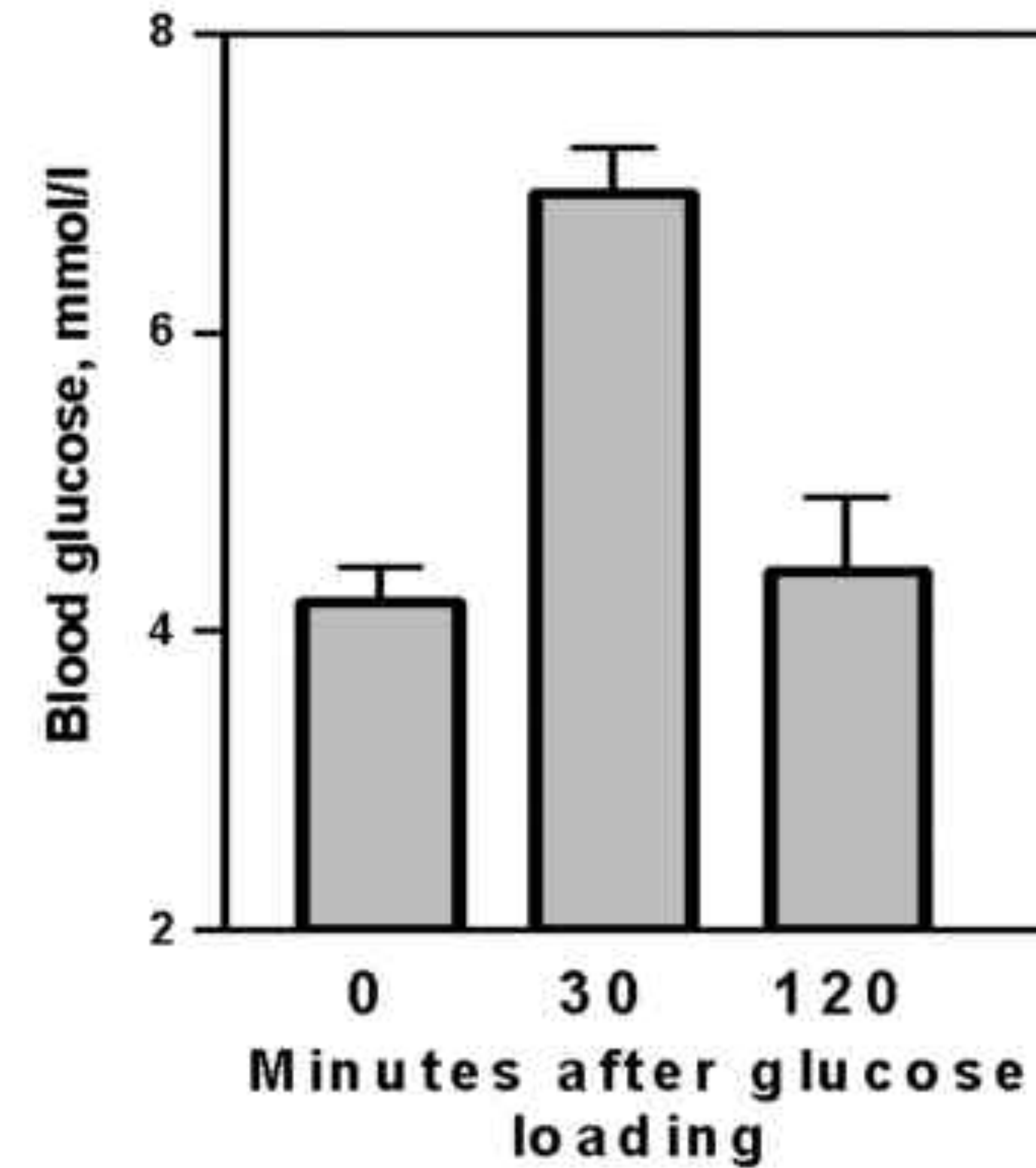


Figure 1: This graph shows how blood glucose levels respond to glucose loading. In the average American's diet, glucose loading is most commonly known as drinking a soda. Most soda's contain between 40-50 g, or between 3-4 tspn, of sugar. This graph shows how an individual's blood sugar spikes after consuming a soda.

Results:

Preventing HG is simple for most people. By consuming a diet of five small meals per day that have adequate levels of carbohydrates and proteins and by consuming extra carbohydrates before and during strenuous exercise, an individual's risk of experiencing HG is less than 15%. For those individuals who have experienced HG, with or without diabetes, a diet similar to that found in Table 1 will reduce the risk of HG recurring by nearly 80%. A person who is not diabetic should not have to monitor his/her blood sugar level with a daily blood test.

Treating someone who is experiencing HG may be scary, but it is important to stay calm. If the person is hot, restraining clothing should be removed and, if s/he has long hair, pull it off his/her neck to help him/her cool down. The safest way to treat the low blood sugar is slowly so as not to send the person's body into shock. First, the individual should be given either 1) three glucose tablets, 2) ½ cup of fruit juice, or 3) five to six pieces of hard candy. Once the person is coherent and the initial sugar boost is taking effect, it's important for that person to consume several servings of carbohydrates and proteins slowly to help build their blood glucose back to a healthy level. At first, his/her blood sugar levels will shoot up past healthy, into the 110s and 120s. As the body regulates itself, the level will drop slowly down to just below 100. This process can take anywhere between two and five hours.

Did You Know...

That the effects of alcohol cause symptoms similar to those of hypoglycemia? One direct effect of alcohol is low blood sugar because the alcohol reduces both the amount of sugar stored in the liver and the amount produced by the body. The body especially feels the effect of the low blood sugar once a hangover begins. A hangover begins once the Blood Alcohol Content (BAC) begins to decrease. Hangover symptoms are usually at their worst once the BAC reaches zero again. Consuming carbohydrates and/or sugar while consuming alcohol may help to reduce the symptoms of not only the alcohol, but also the hangover the following day.

Conclusion:

It is vitally important to get the appropriate amount of both carbohydrates and proteins every day at every meal. The high occurrence of HG in both diabetic patients and non-diabetic patients is most likely caused by a severe lack of not only a healthy diet, but especially by a lack of carbohydrates and proteins. By simply being aware of the carbohydrate and protein content of your food, one could decrease the risk and even prevent HG and lower the risk for developing diabetes. With proper diet, one can also optimize performance academically and athletically.

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Odds of Developing Diabetes After Lifestyle Improvement

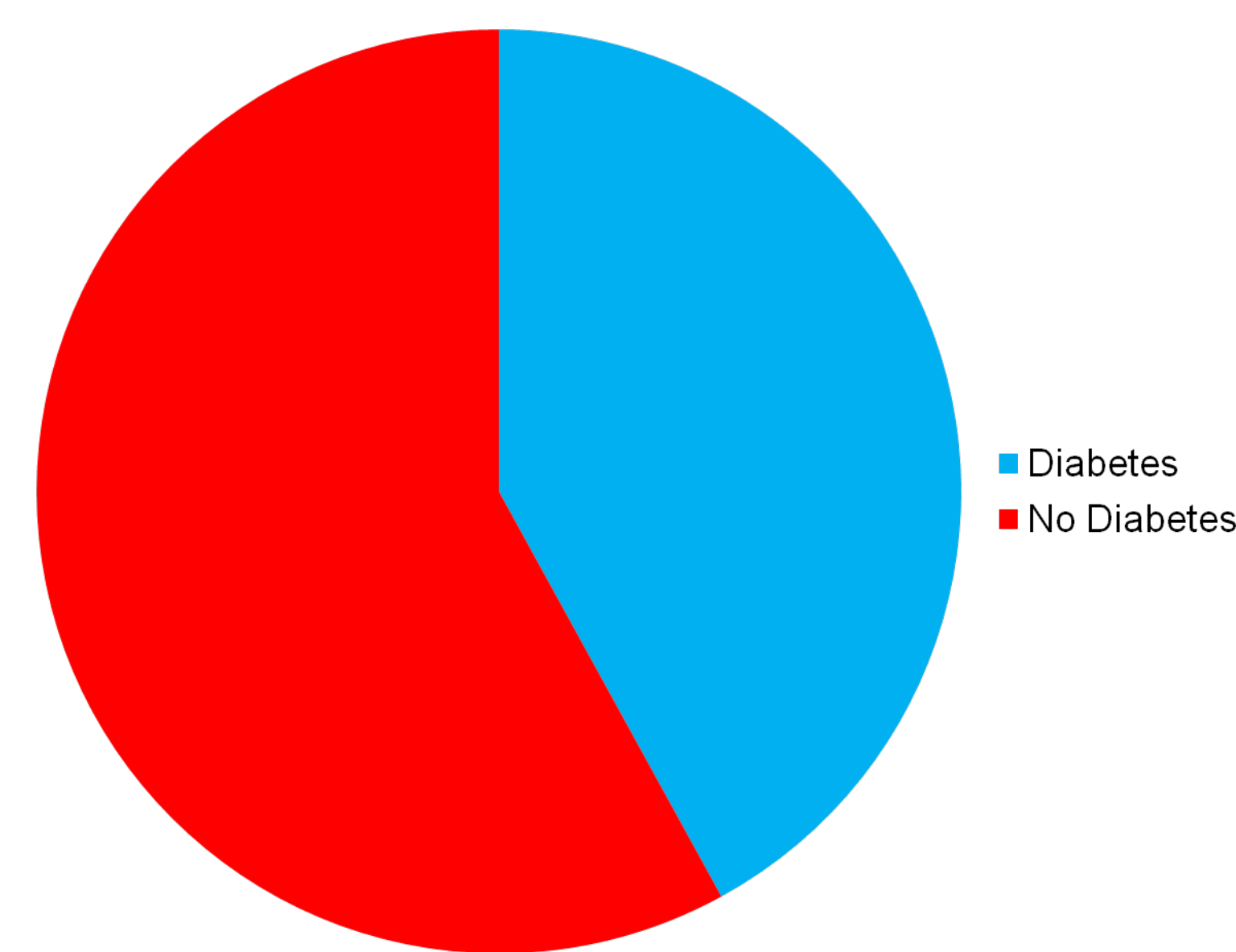


Figure 2: This figure is based on individuals who have been diagnosed with pre-diabetes. Pre-diabetes is defined as the condition in which an individual's blood sugar levels are above normal, but not yet high enough to be diagnosed as diabetes. This figure shows a pre-diabetic individual's chances of developing diabetes if drastic lifestyle changes, such as daily exercise and a healthier diet, are made as opposed to no change at all. The red section shows the odds if lifestyle changes are made. The blue shows the odds if no changes are made.

Recommendations for Athletes: For college athletes involved in strenuous exercise of more than 60 minutes in duration, the best foods and drinks to consume on and off the playing field are water, especially beforehand, and nutrition bars high in carbohydrates to replenish the muscles' supply of glycogen.

It is recommended that athletes begin exercise preparation two to four hours before the actual exercise with a "pre-exercise meal." This meal should be high in carbohydrates to top off muscle fuel stores, moderate in protein, and relatively low in fat and fiber for quicker digestion.

For high-intensity activities lasting longer than 60 minutes nutritionists recommend athletes consume 45 to 90 grams of carbohydrates per hour in order to prevent the body from burning through its store of sugar. To be more specific to any one athlete, multiply that athlete's weight by .45. The resulting number is the number of recommended carbohydrates per hour.

Drinking only water, and lots of it, prior to an event is extremely important for athletes. Consuming a sports drink high in sugar immediately before the event can actually lead to hypoglycemia during the event. During a game or practice, nutritionists recommend athletes drink ½ cup of water per 15-20 minutes for the duration of the workout to prevent bloating. Besides water, drinking chilled fluids (between 59-72 ° F) with an optimal carbohydrate content between 2-5% will minimize the chance of hypoglycemia.