

**THE KETOGENIC DIET:
A HEALTHY ALTERNATIVE FOR
WEIGHT LOSS**

for
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August 1, 2019

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Prof. Mary McDonald
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Dear Dr. McDonald:

The following report is a thorough analysis of the ketogenic diet and its benefits for weight loss.

Since childhood, I have been prone to weight gain, weight loss, then some more weight gain all over again. I could never pinpoint why my weight fluctuated over the years. This summer I decided to go for a routine blood test. I was surprised when I got the results—both my sugar and cholesterol turned out higher than my grandmother's. Considering that my grandma had problems with cardiovascular disease in the past, I decided it was time for a change. As I was doing research on the topic, I finally realized how unhealthily I have been eating. Instead of eating the good carbohydrates like fruits and veggies, I was constantly snacking on refined carbohydrates. The ketogenic diet helped me make the much-needed changes. Today, I feel healthier, more energetic, and I've lost weight.

The ketogenic diet is often looked down upon for its high-fat and low carbohydrate intakes, but on the contrary to popular belief, it has numerous health benefits including that of weight loss and in reducing the risks of diseases like diabetes, heart disease, and Alzheimer's. Western diets typically consist of very high amounts of carbohydrates and although various organizations recommend them in moderate to high amounts, many people still consume far too many. This is not atypical since eating carbohydrates and especially refined carbohydrates only ceases hunger temporarily. Once too many carbohydrates are consumed, they eventually become stored as fat. By following the ketogenic diet, the body no longer needs carbohydrates to make energy and uses consumed and stored fats for this purpose through the process of ketosis. As sugar reserves are depleted and stored fats are burned for energy, weight loss occurs. The ketogenic diet does not limit calories but restricts the consumption of the main macronutrients to rigorous daily proportions. As a result, less calories are consumed on the diet because consuming fats instead of carbohydrates does not lead to hunger. Due to its high fat-burning properties, the ketogenic diet is a healthier alternative for weight loss as well as disease prevention.

Sincerely,

Zuzanna Koziatek

INTRODUCTION TO THE KETOGENIC DIET

If someone is considering the ketogenic diet, it is of the utmost importance to understand how it works first. The ketogenic diet predominantly relies on the consumption of high-fat foods instead of carbohydrates in order to produce bodily energy. Contrary to the popular belief that high-fat diets cause weight gain, following the ketogenic diet leads to the fat-burning state of ketosis. In this state, the body burns its already stored and consumed fats by processing them for energy. In turn, this leads to weight loss and a healthier lifestyle.

WESTERN DIET CAUSES WEIGHT GAIN

People who follow the Western diet rely on glucose for their primary source of fuel because their eating regimen is very high in carbohydrates. As glucose levels rise, the pancreas secretes insulin. Then, the insulin shuttles glucose into cells in order to produce energy.

If too many refined carbohydrates (bread, pasta, sugar, etc.) are being consumed, the body starts producing more insulin. With heightened levels of insulin, the body starts storing the consumed carbohydrates as fat. This fat is often stored in the abdomen causing weight gain.

Since refined carbohydrates are also high in the Glycemic Index (GI) meaning that they are easily digestible and quickly increase blood glucose levels, hunger is experienced fast, and more calories are consumed (Harvard Health Publishing). Research has shown that on top of causing weight gain, “the recent influx of rapidly digestible, high GI carbohydrates in developed nations has contributed to the epidemics of obesity and cardiometabolic disease” (Ludwig 4).

KETOSIS LEADS TO HIGH FAT-BURNING

The aim of the ketogenic diet is to shift the body from using glucose as its primary source of fuel to depending on ketones instead. If the ketogenic diet is strictly followed, the body will adjust to the change in its main dietary fuel. In the first few days of the ketogenic diet, dieters lose water weight since every 1 g of glycogen (the stored version of glucose) is accompanied by 4 g of water.

After about a week, the body is no longer able to use glucose as its primary source of energy and it will have to revert to using fats instead. This state is referred to as **ketosis**. As glucose levels fall, lipase releases triglycerides. Then, fatty acids travel to the liver and ketones are produced to supply the body with energy instead. Fats already stored by the body will be converted to ketones as well. Getting rid of stored fats and using them for energy leads dieters to major weight loss (Greene 287).

High weight loss results with the ketogenic diet are often associated with a reduction in insulin. Since the ketogenic diet drastically cuts down carbohydrates and insulin is responsible for absorbing them, people in ketosis no longer need as much of the hormone. Insulin aids in lipogenesis (fat production) and stunts lipolysis (fat-burning). Therefore, with less insulin being produced, the body is more prone to high fat-burning (Gunnars).

KETOGENIC DIET RULES

The diet requires its followers to count their daily intakes of carbohydrates, proteins, and fats. In order to successfully adhere to this lifestyle change, dieters must eat a very low amount of carbohydrates (5-10%), a moderate amount of proteins (20-25%), and a very high amount of fats (70-80%).

The following report analyzes the disadvantages of high carbohydrate consumption in Western diets and promotes the ketogenic diet as the healthier option for weight loss as the prevention of serious diseases.

DISADVANTAGES OF WESTERN DIETS

Most Western diets rely on carbohydrates for body fuel which leads many people to the unhealthy overconsumption of sugar. Such overconsumption then often results in weight gain and health problems.

CARBOHYDRATES ARE THE USUAL SOURCE OF ENERGY

Carbohydrates are one of the three main macronutrients that the body can use as a source of fuel. The National Institute of Health recommends that people consume an average of a 135 g of carbohydrates and the United States Department of Agriculture recommends that carbohydrates in the American diet should make up more than half of the daily caloric intake. However, it is not uncommon for someone who eats 2,000 calories a day to consume an unreasonable amount of carbohydrates, even 325 g a day. Carbohydrates are said to be necessary for the proper functioning of the brain, but in excess they lead to serious health issues (Szalay).

These macronutrients are found in sugars, starch, and fiber. Foods like fruits, milk, vegetables, and grains all contain carbohydrates.

CONVERSION FROM CARBOHYDRATES TO ENERGY

As the body digests carbohydrates, these macronutrients become fructose and glucose. The small intestines absorb these molecules and help them get into the bloodstream. Once this happens, the sugars will end up in the liver where they will all be converted into glucose. Next, the insulin produced by the pancreas helps distribute the glucose into the bloodstream for the body to use it as energy.

TOO MANY CARBOHYDRATES RESULTS IN IMBALANCE

If the body does not need the glucose, it will be stored as glycogen in the liver and skeletal muscles. Once the glycogen reserve crosses the 2,000-calorie threshold, the body converts the carbohydrates to fat.

Insulin is responsible for both distributing the glucose and signaling that it must be reserved for later. However, the process is not foolproof, and too much glucose is often left over in the bloodstream. The excess explains the fluctuations in energy levels people experience when eating sugar. They get a quick rush followed by a longer crash.

SOME CARBS ARE BETTER THAN OTHERS

Of the three types of carbohydrates—starches, sugars, and fiber—refined carbohydrates are the ones to avoid when trying to lose weight. Refined carbohydrates have been stripped of their natural nutrients and fiber.

FIBER IS RESPONSIBLE FOR DIGESTIVE HEALTH

Unlike other major food sources, fiber passes through the body intact making it highly important for proper digestion. Most people who eat the Western diet do not get nearly enough fiber as many Americans consume half of the 25-30 g recommended daily amount of fiber. (American Diabetes Association).

Soluble fiber aids in lowering cholesterol and glucose levels. This type of fiber is easily found in foods like apples, oats, and beans. **Insoluble fiber** aids in increasing stool bulk and makes it easier for food to move through the digestive system. This type of fiber is found in beans, nuts, and whole-wheat flour (Mayo Clinic).

STARCHES OVERVIEW

When choosing between refined and whole grain starches, the latter is a much healthier choice because **whole grain starches** still contain their natural properties.

Refined starches do not contain valuable fiber and nutrients because of food processing. They become empty calories that do not serve the body any real purpose aside from temporary fullness. White flour made from refined wheat is an example of a dangerous refined grain starch if eaten in large excesses (Bjarnadottir). If refined starches aren't completely avoided, they should be limited or replaced with whole grain starches.

Refined grain foods include white rice, cookies, and white bread. Whole grain foods include brown rice, quinoa, and couscous.

SIMPLE AND ADDED SUGARS

Simple sugars are healthier than added sugars because they occur in foods naturally and are not processed. Examples of healthy simple sugar containing foods include fruits and milk. Added sugars refer to any sugars that have been added to food during processing. This type of sugar is best to be avoided as it has no nutritional value and can be considered as “empty calories” (American Diabetes Association).

NUTRITIONAL DATA FOR STARCHY FOODS PER 100 G

STARCH TYPE	CALORIES	TOTAL CARBOHYDRATE	FIBER	SUGAR
Brown Rice	111	23 g	1.8 g	0.4 g
Cheese Pizza	280	30 g	1.7 g	3.2 g
Corn	86	19 g	2.7 g	3.2 g
Kidney Beans	127	23 g	6 g	0.3 g
Lima Beans	115	21 g	7 g	2.9 g
Oats	389	66 g	11 g	0 g
Peas	81	14 g	5.7 g	5.7 g
Potatoes	90	21 g	3 g	6 g
Quinoa	120	21 g	2.8 g	0.9 g
White Bread	265	49 g	2.7 g	5 g

TABLE 1 A 100 g of potatoes is approximately two-thirds of a medium sized potato. **Serving size matters.**
SOURCE: DERIVED FROM UNDER ARMOUR

NUTRITIONAL DATA FOR FOODS CONTAINING SUGAR PER 100 G

SUGAR TYPE	CALORIES	TOTAL CARBOHYDRATE	FIBER	SUGAR
Milk	60	4.52 g	0 g	5.26 g
Strawberries	32	7.68 g	2 g	4.66 g
Raspberries	52	11.94 g	6.5 g	4.42 g
Bananas	89	22.84 g	2.6 g	12.23 g
Apple	52	13.81 g	2.4 g	10.39 g
Orange	62	15.39 g	3.1 g	12.25 g
White Sugar	387	100 g	0 g	100 g
Cane Sugar	375	100 g	0 g	100 g
Agave Syrup	310	76 g	.2 g	68 g
Cookies (Chocolate-chip)	489	64.06 g	2.9 g	34.34 g
Milk Chocolate	535	59.4 g	3.4 g	51.5 g

TABLE 2 100 g of sugar amounts to 25 teaspoons and 100 g of chocolate typically amounts to one candy bar. **Serving size matters.**
SOURCE: DERIVED FROM UNDER ARMOUR

When choosing which carbohydrates to eat, it is important to look at the amount of fiber and sugar. For instance, agave syrup is sweeter in comparison to white sugar in taste but contains 32 g less sugar and a small amount of fiber. Fruits contain simple sugar and are therefore nutritious. Between raspberries and a refined carbohydrate like chocolate-chip cookies, the raspberries have far less calories and have significantly more fiber.

KETOGENIC DIET IS THE HEALTHIER CHOICE

The ketogenic diet is highly effective in promoting weight loss through the process of ketosis that is reached by restricting dieters to a rigorous daily consumption of the 3 primary macromolecules. In addition to weight loss, the ketogenic diet is also effective in the prevention of heart disease and diabetes.

BENEFITS OF THE KETOGENIC DIET

Studies show that the ketogenic diet is not only effective for weight loss, but other health related issues as well. In one such study, 83 obese patients were regularly monitored over the period of 24 weeks. Collectively, the patients lost an average of 30 lbs at the end of the experiment. Researchers also observed a significant decrease in the average body mass index of the patients. Additionally, whereas LDL cholesterol (bad cholesterol), blood glucose, and triglycerides significantly decreased, HDL cholesterol (good cholesterol) significantly increased (Dashti et al. 205-205). As high levels of blood glucose lead to diabetes and high amounts of LDL cholesterol lead to heart disease, the ketogenic diet is effective in curbing the onset of those diseases.

In another study (Table 3), 53 obese women were split into 2 groups. The first group was administered a low carbohydrate diet. The other group was administered a low-fat diet. Over the period of 6 months, the women in the low carbohydrate diet lost almost twice as much weight as the low-fat diet group with no negative side effects (Brehm et al. 1617-1623).

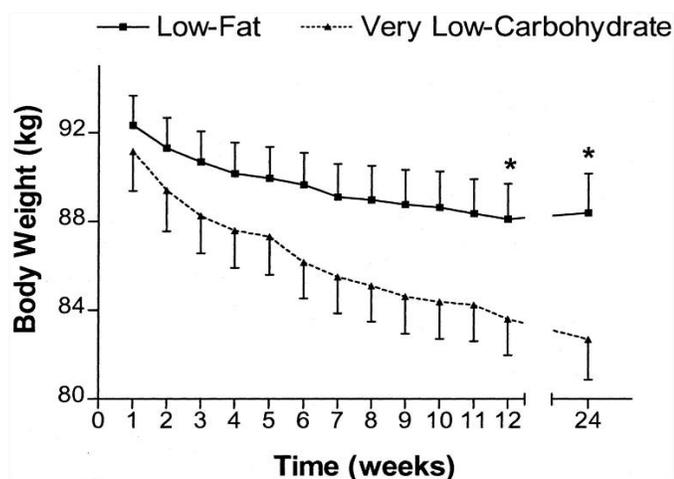


FIGURE 1 RESULTS OF STUDY COMPARING LOW-FAT AND VERY LOW-CARBOHYDRATE DIETS
SOURCE: DERIVED FROM THE ENDOCRINE SOCIETY

GOOD AND BAD FATS

Of the different types of fats, only saturated, polyunsaturated, monosaturated, and trans fats are vital to the ketogenic diet. Processed polyunsaturated and processed trans fats may not be consumed.

SATURATED	MONOUNSATURATED	TRANS	POLYUNSATURATED
Red meat	Extra Virgin Olive Oil	Beef	Fish
Butter	Avocados	Pork	Fish Oil
Cream	Avocado Oil	Lamb	Flaxseed
Eggs	Macadamia Nut Oil	Butter	Chia Seeds
Coconut Oil	Olives	Dairy	

TABLE 3 FATS RECOMMENDED ON THE KETOGENIC DIET Aside from milk which is high in sugar content, most dairy is acceptable. SOURCES: DATA DERIVED FROM TASTEAHOLICS AND WEBMD

PROCESSED POLYUNSATURATED	PROCESSED TRANS
Canola Oil	Fast Food
Peanuts	Margarine
Vegetable Oil	Cookies

TABLE 4 FATS PROHIBITED ON THE KETOGENIC DIET Not all processed fats are unhealthy, but many of them are refined and contain high amounts of sugar that must be avoided on this diet.

SOURCES: DATA DERIVED FROM TASTEAHOLICS AND WEBMD

PROTEINS ON THE KETOGENIC DIET

The ketogenic diet allows for the same amount of daily proteins as recommended amount by the Institute of Medicine (Szalay). Typically found in animal products and nuts, proteins are essential to building muscle mass.

ROAD TO KETOSIS

In order to reach the high-fat burning state of ketosis, dieters must limit their daily caloric intake to the following proportions: 5-10% carbohydrates, 20-25% proteins, and 70-80% fats. It is recommended not to exceed 20-30 g of carbohydrates per day.

	MEAL	NUTRITIONAL VALUE
BREAKFAST	Salad Sandwich	Calories: 419 Carbs: 4 g Fat: 43 g Protein: 4 g
LUNCH	Creamy Mushroom with Chicken & Zucchini Cream Soup	Calories: 453 Carbs: 6 g Fat: 36 g Protein: 15 g
DINNER	Cauliflower and Cheese Breadsticks	Calories: 185 Carbs: 4 g Protein: 11 g Fats: 12 g
TOTAL CALORIES		1055
CARBS		14 g
FAT		91 g
PROTEIN		30 g

TABLE 5 HYPOTHETICAL MEAL PLAN ON THE KETOGENIC DIET When following the ketogenic diet, it is important to count carbohydrates, proteins, and fats that are being consumed to upkeep with the correct proportions the diet requires. This hypothetical meal plan matches those proportions almost perfectly. SOURCE: DERIVED FROM "KETO DIET FOR BEGINNERS" BY PATRICIA GREENE (2019).

THE KETO FLU

After the first few days on the ketogenic diet, dieters may start to notice some temporary unpleasant side effects that occur during the switch to the high-fat burning state of ketosis. These side effects are collectively referred to as the **keto flu** and they tend to resemble the symptoms of a real flu. Symptoms of the keto flu include: fatigue, lethargy, headache, brain fog, irritability, sugar cravings, trouble sleeping, and dizziness.

Medical research on the topic of the keto flu typically associates it with carbohydrate withdrawal. In order to ease the symptoms and adjust to ketosis smoothly, doctors recommend drinking more water than usual (WebMD). Eating a lot of healthy fats is not only essential to the ketogenic diet, but to overcoming the initial keto flu (Greene 782).

In order to make sure that ketosis has been reached or is being maintained, ketone levels can be measured via a blood ketone meter, breathalyzer, or urine ketone strips. Of these 3 choices, urine ketone strips are the cheapest and most accessible option.

CONCLUSION

The ketogenic diet is a healthy alternative not only for those struggling to lose weight, but for people concerned with health problems like diabetes and heart disease. In comparison with Western diets, the ketogenic diet makes it more feasible for dieters to stick to their new eating regiments since carbohydrates only temporarily relieve hunger. Although many people disregard the ketogenic diet for being high in fat consumption, this diet is great for reducing bad cholesterol and promoting the good kind. Entering the state of ketosis may come with the keto flu, but after ketosis is fully achieved, the body no longer struggles with fluctuations in blood glucose levels and the fatigue that comes with such fluctuations.

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