Scientists and dieticians are starting to agree on a recipe for a long, healthy life. It's not sexy, and it doesn't involve fancy pills or pricey diet potions.

Fill your plate with plants. Include vegetables, whole grains, healthy fats, and legumes. Don't include a lot of meat, milk, or highly processed foods that a gardener or farmer wouldn't recognize.

"There's absolutely nothing more important for our health than what we eat each and every day," Sara Seidelmann, a cardiologist and nutrition researcher at Brigham and Women's Hospital in Boston, told Business Insider.

Seidelmann recently published a massive, blockbuster global study of the eating patterns of more than 447,000 people around the world.

What she discovered - and what is probably not a huge surprise - is that no matter where you live or what your daily diet is like, banning entire food groups and thinking you can cheat your way into good health might work for a while, but it could also send you into an early grave.

<table>
<thead>
<tr>
<th>RISK</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rebounding to old eating habits</td>
<td>• Change your food environment to make keto easier to follow</td>
</tr>
<tr>
<td></td>
<td>• Learn and implement the principles behind how to lose weight and keep it off</td>
</tr>
<tr>
<td>Increased hunger and cravings</td>
<td>• Eat the right amount of fat and protein every day</td>
</tr>
<tr>
<td></td>
<td>• Have keto snacks and recipes that you can use to satisfy your cravings</td>
</tr>
<tr>
<td>Bad breath</td>
<td>• Give your body more time to adapt to keto</td>
</tr>
<tr>
<td></td>
<td>• Use gum, mouthwash, and other breath fresheners when necessary</td>
</tr>
<tr>
<td>Mild dehydration</td>
<td>• Drink plenty of water every day</td>
</tr>
<tr>
<td>Electrolyte depletion</td>
<td>• Consume more leafy greens, avocados, and salt to increase sodium, magnesium, and potassium levels</td>
</tr>
<tr>
<td></td>
<td>• Supplement with magnesium glycinate and potassium gluconate if necessary</td>
</tr>
<tr>
<td>Micronutrient deficiencies</td>
<td>• Eat a wide variety of keto foods, especially eggs, meat/poultry, high-fat dairy, organ meats, seafood, and low-carb vegetables</td>
</tr>
<tr>
<td></td>
<td>• Supplement with vitamin and minerals when necessary</td>
</tr>
<tr>
<td>Digestive issues</td>
<td>• Stay hydrated and make sure you are consuming adequate amounts of vitamins and minerals</td>
</tr>
<tr>
<td></td>
<td>• Add more fiber and probiotic foods to your diet</td>
</tr>
<tr>
<td></td>
<td>• Use digestive enzymes if necessary</td>
</tr>
<tr>
<td></td>
<td>• If a food allergy or sensitivity is suspected, try using an elimination diet and/or allergy test to identify problem foods</td>
</tr>
</tbody>
</table>
The popular ketogenic diet, which involves strictly limiting carbs to less than 50 grams a day (that's no more than two apples' worth) and subsisting primarily on high-fat foods, is one of those restrictive diets that could have harmful long-term consequences.

Other low-carb weight-loss diets that fall into this category include paleo, Atkins, Dukan, and Whole 30. Nutrition experts say that besides their potential for harm, these popular diets are really hard to follow.

Some benefits of going keto are difficult to dispute. Following a high-fat, low-carb diet can be a solid strategy for rapid weight loss and blood-sugar control.

The keto diet can also be great for children with tough-to-control epileptic seizures. For decades, people have seen stellar results managing those conditions on a keto diet with the help and guidance of professionals.
But there's some limited evidence that going low-carb might also lead people to become less tolerant of glucose and develop diabetes, though more research is needed.

What we do know, based on carefully conducted laboratory testing of overweight men, is that going keto probably doesn't help burn more body fat than a regular regimen.

Instead, it forces people to dramatically curb their sugar intake (remember, sugar is 100 percent carbohydrate) and kick processed foods to the curb.

Those are both good habits for overall health and blood-sugar levels, and they can help reduce your likelihood of developing cancer.

But like taking aspirin, eating a special high-fat, low-carb diet probably shouldn't be an everyday habit for otherwise healthy people. Our bodies simply aren't designed to fuel up on fats, unless we're literally starving.

Even Josh Axe, a keto evangelist, has said it's not a diet that should be followed for more than a few months at a time.

Finally, low-carb diets make it easy to neglect key nutrients like magnesium, calcium, and potassium that can be plentiful on less restrictive diets with fresh, high-carb foods like beans, bananas, and oats.

More studies suggest that people who eat whole, nutrient-rich foods live the longest and have a lower risk of cancer

More research that backs up Seidelmann's was presented in August at the European Society of Cardiology Congress.

Researchers who presented at that conference studied the self-reported eating patterns of nearly 25,000 people in the US and compared their results with studies involving more than 447,500 people.

Again, they found that those who ate a moderate amount of carbohydrates were more likely to live longer than either low-carb or high-carb dieters.

"Our study suggests that in the long-term, [low-carb diets] are linked with an increased risk of death from any cause, and deaths due to cardiovascular disease, cerebrovascular disease, and cancer," Maciej Banach, a professor at the Medical University of Lodz in Poland who helped write the study, said in a release.
A third study published this week in the journal *PLOS Medicine* that surveyed the eating habits of 471,495 Europeans over 22 years found that people whose diets had lower "nutritional quality" (i.e., fewer fresh vegetables, legumes, and nuts) were more likely to develop some of the most common and deadliest forms of cancer, including colon, stomach, lung, liver, and breast cancers.

**Basically, we're learning there's no shortcut to healthy eating**

It can be tricky calculating the precise kind of diet that leads to a long life. Part of the problem is that (thankfully) we don't live our lives in highly controlled laboratory conditions.

Until that terrifying day arrives and we all become well-studied lab rats, we have to rely on long-term observational data, usually in the form of surveys, to know more about which diets are the best long-term plans.

In study after study, survey data from around the world has shown that people who stick to limited amounts of meats, dairy, and processed foods while fueling up on fiber-rich plant-based foods including vegetables, whole grains, nuts, and, yes, even carb-heavy beans have some of the best health outcomes. Seidelmann describes their diets as being rich in "whole foods."

"They were not processed," she said of the diets of people in her study who lived the longest.

These people would consume whole-grain rice, not white varieties. They'd eat plants like fruits and vegetables, not more-processed versions like fruit juice or smoothies.

"You have the intact fiber; you have a lot more nutrients," Seidelmann said.

Fiber isn't just good for keeping your gut moving - scientists feeding diets rich in fiber to mice are discovering that the carbs, which can't be absorbed by the body, can help protect aging brains from some of the damaging chemicals associated with Alzheimer's and reduce inflammation in the gut.

They're confident that the health benefits of eating more fiber extend to humans too.

But a plant-based regimen with lots of fiber can be tricky to maintain on a low-carb diet, because some of the highest-fiber foods are also high in carbs, such as savory beans, crunchy peas, and sweet fruits.
"It is not a common pattern to eat very low-carb, strictly plant-based," Seidelmann said. "At least in the Western world, it tends to be more animal-based. That just is what it is."

People on low-carb diets often turn to more butter and meat for sustenance, which can increase blood pressure and, in the case of processed meats, contribute to cancer.

Meat and dairy can also contribute to inflammation in the body, which can help cancerous tumors form and grow.

The new scientific findings all support what parents, trainers, and coaches have been saying for years: eat less junk, and continue to be skeptical of the latest miracle diet, be it keto or any other passing fad.

Experts Condemn Keto. Will People Finally Stop?

U.S. News and World Report ranked the keto diet near-last for the third year in a row, and other outlets have begun to question it, too. Will we finally get over keto this year?

By Hannah Smothers
Jan 6 2020, 8:42pm
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For the third consecutive year, the annual U.S. News and World Report ranked the exceeding popular keto diet as one of the worst possible diets to follow. The ranking is culled from medical journals and government data, plus input from a panel of health and nutrition experts; since at least 2018, this review process has placed keto at or just above the very bottom of the list. Yet people
continue to follow this diet, shoveling heaps of protein and fats into their mouths and eating so little carbs it makes them **physically ill**.

The core notion within keto (short for ketogenic) is that it forces the body into “ketosis,” where it preferentially burns fat because there is no carbohydrate-derived fuel to use. (Never mind that your body can absolutely burn fat without being in this state of forced stress.) To achieve ketosis, the keto diet advises getting most of your calories from fat, eating moderate amounts of protein, and eating fewer carbs per day than are in an apple. Studies have shown that sort of diet to be helpful for children with epilepsy and people with diabetes, but in an otherwise healthy person, it’s routinely discouraged.

As the old adage goes, third time’s the charm!!!!!! Even though doctors and scientists have been hollering about this for years, it seems the idea that keto is Bad may finally be working its way into the grander ether. A **recent CNN report** (published on “National Keto Day,” a thing made up by Vitamin Shoppe) poses the obvious question: how has a diet so despised by health experts remained so popular? “Experts say it's because its legions of fans are focusing on the short-term benefits of fast weight loss, without factoring in possible long-term risks,” CNN reports. And in a **recent keto explainer in the New York Times**, Whitney Linsenmeyer, a spokeswoman for the Academy of Nutrition and Dietetics, chalked the diet’s popularity up to America being in “a state of carbophobia;” additional experts warned against the long-term effects (like increased risk of cardiovascular disease) keto might have on the body.

Keto can seem like a fun, flirty diet compared to other, even more rigorous options: you can eat cheese, steaks, even hamburger patties. That’s fun! But eating fewer than 20 grams of carbs per day, **as the diet advises**, is **unhealthy and unsustainable**, as David Katz, founding director of the Yale University Prevention Research Center, told CNN. (The average recommended range, for comparison, is **between 225–325 grams of carbs** per day.) Eating so few carbs even sends many new keto-ers into something called the “**keto flu**,” a sure sign your body is extremely pissed off at what you’re doing to it.
According to Google’s own data, the second-most popular health-related search on its engine in 2019 was, “What is keto?” That’s a slightly lower ranking than last year, when “What is keto?” was the number one health-related question people typed into Google....... but it’s still disconcertingly high. The staying power of the ketogenic diet (what “keto” is short for) has simply gotta be admired; how does a diet that is largely bad for you remain something people still want to know about?

People who do keto talk about it as if they’re being paid to. Like most other diets, keto’s best advertisers are the people painfully dragging themselves through its rigorous limits: No carbs, no sugars, no alcohol, no joy, etc. Keto followers are supposed to obtain 75 percent of their calories through fats, like meat (and bacon!!!). Itinerant dieters are inordinately thrilled by this, maybe because most diets don’t afford them any category of food from which they can eat “anything” they want, or maybe because it’s an extremely sharp shift away from the “Fats Are Evil” discourse that dominated the 90s. “Yes, I can eat all the cheese I want!!!!” may as well be the unofficial slogan of keto, even though eating all the cheese one wants isn’t a wise or sustainable choice, and overeating—even keto-approved foods—will still cause weight gain.

Keto is supposed to “work” by putting the body into a state of “ketosis,” a sort of shock-state where the body starts breaking down stored fats to gain energy. It also “works” because it limits carbs so severely, dieters can’t even eat one (1) whole apple if they properly abide by the rules. Most varieties of restriction diets often “work,” at least temporarily, because while it’s still possible to
overeat and gain weight no matter which arbitrary restriction rules you’re following, it’s simply boring to eat a lot of a limited range of things after a while, even if those things include bacon. Many people who lose weight by following the keto diet might’ve lost weight by paying attention to what they are eating in general, which is another thing any arbitrary restriction forces them to do.

But that wouldn’t be any fun at all, would it? It’s way less exciting to say, “no, thanks” to a post-lunch cookie than it is to chomp into a wheel of bacon-wrapped cheese (is this real?) while yelling, “My diet allows this!!!” Keto was born in this decade and unfortunately will probably not die within it; January is just around the corner, and many people will likely continue to type “what is keto” into their little Google search bars, looking for a way to lose holiday pounds that probably don’t exist, and that don’t need losing.


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Clinical Cardiology

Long-term effects of a ketogenic diet in obese patients

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Abstract

Obesity has become a serious chronic disease in both developing and developed countries. Furthermore, it is associated with a variety of chronic diseases (1–4). It is estimated that in the United States alone approximately 300,000 people die each year from obesity-related diseases (5,6). Different methods for reducing weight using reduced calorie and fat intake combined with exercise have failed to show sustained long-term effects (7–9). Recent studies from various laboratories (10,11), including our own (12), have shown that a high fat diet rich in polyunsaturated fatty acids (ketogenic diet) is quite effective in reducing body weight and the risk factors for various chronic diseases. The ketogenic diet was originally introduced in 1920 (13). In this diet, the fat to carbohydrate ratio is 5:1. While there was a significant decrease in the weight of obese patients who were on a ketogenic diet (12), the reverse occurred when the diet changed to one high in carbohydrates (14).
It should be noted that the concept that fat can be eaten ad libitum and still induce weight loss in obese subjects is not a recent one (13–33). Ketosis occurs as a result of the change in the body’s fuel from carbohydrate to fat. Incomplete oxidation of fatty acids by the liver results in the accumulation of ketone bodies in the body. A ketogenic diet maintains the body in a state of ketosis, which is characterized by an elevation of D-β-hydroxybutyrate and acetoacetate.

Mild ketosis is a natural phenomenon that occurs in humans during fasting and lactation (19,20). Postexercise ketosis is a well-known phenomenon in mammals. Although most of the changes in the physiological parameters induced following exercise revert back to their normal values rapidly, the level of circulating ketone bodies increases for a few hours after muscular activity ceases (21). It has been found that in trained individuals, a low blood ketone level protects against the development of hypoglycemia during prolonged intermittent exercise (22). In addition, ketosis has a significant influence on suppressing hunger. Thus, a ketogenic diet is a good regulator of the body’s calorie intake and mimics the effect of starvation in the body.

It is generally believed that high fat diets may lead to the development of obesity and several other diseases such as coronary artery disease, diabetes and cancer. This view, however, is based on studies carried out in animals that were given a high fat diet rich in polyunsaturated fatty acids. In contrast, our laboratory has recently shown that a ketogenic diet modified the risk factors for heart disease in obese patients (12).

Although various short-term studies examining the effect of a ketogenic diet in reducing the weight of obese patients have been carried out (10), its long-term effects in obese subjects are not known (15). Therefore, the purpose of the present study was to investigate the long-term effects of a ketogenic diet on obesity and obesity-associated risk factors in a large population of obese patients.

Go to:

PATIENTS AND METHODS

Patients and biochemical analysis

The prospective study was carried out at the Academic Department of Surgery, Consultation and Training Centre, Faculty of Medicine, Kuwait University (Jabriya, Kuwait) in 83 obese subjects (39 men and 44 women). The body mass index (BMI) of men and women was 35.9±1.2 kg/m² and 39.4±1.0 kg/m², respectively. The mean age was 42.6±1.7 years and 40.6±1.6 years for men and women, respectively. The mean age, initial height, weight and BMI for all patients are given in Table 1. Fasting blood tests were carried out for all of the subjects. Initially, all patients were subjected to liver and renal function tests, and glucose and lipid profiles, using fasting blood samples, and a complete blood count. Thereafter, fasting blood samples were tested for total cholesterol, high density lipoprotein (HDL) cholesterol, low density lipoprotein (LDL) cholesterol, triglycerides, blood sugar, urea and creatinine levels at the eighth, 16th and 24th week. In addition, weight and height measurements, and blood pressure were monitored at each visit.

**TABLE 1**

Patient data at baseline before treatment with the ketogenic diet
<table>
<thead>
<tr>
<th></th>
<th>Age (years)</th>
<th>Height (m)</th>
<th>Weight (kg)</th>
<th>Body mass index (kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>39</td>
<td>42.6±1.7</td>
<td>1.7±0.01</td>
<td>102.4±3.7</td>
</tr>
<tr>
<td>Women</td>
<td>44</td>
<td>40.6±1.6</td>
<td>1.6±0.01</td>
<td>99.8±2.9</td>
</tr>
</tbody>
</table>

All data are mean ± SEM

**Protocol for ketogenic diet-induced body weight reduction**

All 83 subjects received the ketogenic diet consisting of 20 g to 30 g of carbohydrate in the form of green vegetables and salad, and 80 g to 100 g of protein in the form of meat, fish, fowl, eggs, shellfish and cheese. Polyunsaturated and monounsaturated fats were also included in the diet. Twelve weeks later, an additional 20 g of carbohydrate were added to the meal of the patients to total 40 g to 50 g of carbohydrate. Micronutrients (vitamins and minerals) were given to each subject in the form of one capsule per day (Table 2).

**Table 2**

Composition of the capsule

- Para-aminobenzoic acid (PH) 30 mg
- Vitamin B₁ (thiamin mononitrate) (BP) 15 mg
- Vitamin B₂ (riboflavin) (BP) 3 mg
- Vitamin B₅ (nicotinamide) (BP) 25 mg
- Vitamin B₆ (calcium pantothenate) (PH) 3 mg
<table>
<thead>
<tr>
<th>Vitamin</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin B&lt;sub&gt;6&lt;/sub&gt; (pyridoxine HCl) (BP)</td>
<td>5 mg</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;12&lt;/sub&gt; (cyanocobalamin) (BP)</td>
<td>10 μg</td>
</tr>
<tr>
<td>Biotin (PH)</td>
<td>5 μg</td>
</tr>
<tr>
<td>Folic acid (BP)</td>
<td>100 μg</td>
</tr>
<tr>
<td>Vitamin C (ascorbic acid) BP</td>
<td>60 mg</td>
</tr>
<tr>
<td>Vitamin A (retinol) (USP; 2000 IU)</td>
<td>0.6 mg</td>
</tr>
<tr>
<td>Vitamin D (calciferol) (INN; 200 IU)</td>
<td>5 μg</td>
</tr>
<tr>
<td>Vitamin E (tocopherol acetate) (USNF)</td>
<td>10 mg</td>
</tr>
<tr>
<td>Lecithin (PH)</td>
<td>40 mg</td>
</tr>
<tr>
<td>Wheat germ oil</td>
<td>100 mg</td>
</tr>
<tr>
<td>Lysine (FP)</td>
<td>40 mg</td>
</tr>
<tr>
<td>Methionine (DAB)</td>
<td>60 mg</td>
</tr>
</tbody>
</table>
Rutin (DAB) (rutoside) (INN) 10 mg

Iron (as fumarate; BP) 12 mg

Calcium (as dicalcium phosphate) (BP) 52 mg

Phosphorus (as dicalcium phosphate) (BP) 40 mg

Potassium (as KCl) (BP) 2 mg

Zinc (as ZnSO\(_4\)) (BP) 8 mg

Copper (as CuSO\(_4\)) (BP) 1 mg

Manganese (as MnSO\(_4\)) (BP) 2 mg

Iodine (as potassium iodide) (BP) trace

Ginseng (Siberian) (5:1 concentrated extract) 4 mg

Statistical analysis

Statistical differences between body weight, total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides, level of fasting blood sugar, and urea and creatinine levels before
and after the administration of the ketogenic diet were analyzed using a paired Student’s $t$ test using the Stat-view version 4.02 (Abacus Concepts Inc, USA). Weight, BMI and all biochemical parameters are expressed as mean ± SEM.

RESULTS

The mean initial weight of the subjects was 101.03±2.33 kg. The weight decreased significantly during all stages of the treatment period. The body weights at the eighth, 16th and 24th week were 91.10±2.76 kg, 89.39±3.4 kg and 86.67±3.70 kg, respectively (Figure 1). Similar to the loss in body weight, a significant decrease was observed in the BMI of the patients following the administration of the ketogenic diet. The initial BMI, and the BMI after the eighth, 16th and 24th week were 37.77±0.79 kg/m$^2$, 33.90±0.83 kg/m$^2$, 33.24±1.00 kg/m$^2$ and 32.06±1.13 kg/m$^2$, respectively (Figure 2).

Figure 1

Reduction in body weight at eight, 16 and 24 weeks following the administration of the ketogenic diet in obese patients. The weights are expressed as mean ± SEM.
Decrease in body mass index at eight, 16 and 24 weeks during the administration of a ketogenic diet in obese patients. The values are expressed as mean ± SEM.

The level of total cholesterol showed a significant decrease from week 1 to week 24 (Figure 3). The level of HDL cholesterol significantly increased (Figure 4), whereas LDL cholesterol levels significantly decreased with treatment (Figure 5). The level of triglycerides decreased significantly after 24 weeks of treatment. The initial level of triglycerides was 2.75±0.23 mmol/L, whereas at week 24, the level decreased to 1.09±0.08 mmol/L (Figure 6). The level of blood glucose significantly decreased at week 24. The initial blood glucose level and its level at the eighth, 16th and 24th week were 7.26±0.38 mmol/L, 5.86±0.27 mmol/L, 5.56±0.19 mmol/L and 5.62±0.18 mmol/L, respectively (Figure 7). The changes in the levels of urea (Figure 8) and creatinine (Figure 9) were not statistically significant.
Figure 3)
Decreased levels of total cholesterol (expressed as mean ± SEM) in obese patients at eight, 16 and 24 weeks during the administration of a ketogenic diet.

Figure 4)
Changes in the level of high density lipoprotein (HDL) cholesterol in obese patients during treatment with a ketogenic diet for a period of 24 weeks. Data are expressed as mean ± SEM.
Figure 5)
Changes in the level of low density lipoprotein (LDL) cholesterol during treatment with a ketogenic diet in obese patients at eight, 16 and 24 weeks. The values are expressed as mean ± SEM.

Figure 6)
Changes in the level of triglycerides in obese patients during treatment with a ketogenic diet over a period of 24 weeks. The values are expressed as mean ± SEM.
Figure 7)
Decreased levels of blood glucose (expressed as mean ± SEM) in obese patients at eight, 16 and 24 weeks during the administration of a ketogenic diet

Figure 8)
Changes in the level of urea in obese patients during a 24-week ketogenic diet. The level of urea is expressed as mean ± SEM
DISCUSSION

Until recently, ketosis was viewed with apprehension in the medical world; however, current advances in nutritional research have discounted this apprehension and increased public awareness about its favourable effects. In humans, ketone bodies are the only additional source of brain energy after glucose (23,24). Thus, the use of ketone bodies by the brain could be a significant evolutionary development that occurred in parallel with brain development in humans. Hepatic generation of ketone bodies during fasting is essential to provide an alternate fuel to glucose. This is necessary to spare the destruction of muscle from glucose synthesis.

A ketogenic diet is clinically and experimentally effective in antiepileptic and antiobesity treatments; however, the molecular mechanisms of its action remain to be elucidated. In some cases, a ketogenic diet is far better than modern anticonvulsants (25). Recently, it has been shown that a ketogenic diet is a safe potential alternative to other existing therapies for infantile spasms (27). It was further shown that a ketogenic diet could act as a mood stabilizer in bipolar illness (28). Beneficial changes in the brain energy profile have been observed in subjects who are on a ketogenic diet (28). This is a significant observation because cerebral hypometabolism is a characteristic feature of those who suffer from depression or mania (28).

It has also been found that a ketogenic diet affects signal transduction in neurons by inducing changes in the basal status of protein phosphorylation (29). In another study (30), it was shown that a ketogenic diet induced gene expression in the brain. These studies provide evidence to explain the actions of a ketogenic diet in the brain.

One of the mechanisms of a ketogenic diet in epilepsy may be related to increased availability of beta-hydroxybutyrate, a ketone body readily transported through the blood-brain barrier. In support of this hypothesis, it was found that a ketogenic diet was the
treatment of choice for glucose transporter protein syndrome and pyruvate dehydrogenase deficiency, which are both associated with cerebral energy failure and seizures (26).

One argument against the consumption of a high fat diet is that it causes obesity. The major concern in this regard is whether a high percentage of dietary fat promotes weight gain more than a low percentage of fat intake. Because fat has a higher caloric density than carbohydrate, it is thought that the consumption of a high fat diet will be accompanied by a higher energy intake (31). On the contrary, recent studies from our laboratory (12) and many other laboratories (24,32–34) have observed that a ketogenic diet can be used as a therapy for weight reduction in obese patients.

It has been found that a sugary diet is the root cause of various chronic diseases of the body. A recent study (35) showed that sugar can accelerate aging. Several recent studies (36,37) have pointed to the fact that a diet with a high glycemic load is independently associated with the development of cardiovascular diseases, type II diabetes and certain forms of cancer. Glycemic load refers to a diet of different foods that have a high glycemic index. Glycemic index is a measure of the elevation of glucose levels following the ingestion of a carbohydrate. The classification of a carbohydrate based on its glycemic index provided a better predictor of risk for coronary artery diseases than the traditional method of classification of carbohydrate into simple or complex forms (38). In other studies (38–46), it was shown that the risk of dietary glycemic load from refined carbohydrates was independent of other known risk factors for coronary diseases.

It is now evident that high carbohydrate diets increase fasting plasma triglyceride concentrations (47–51) and decrease HDL cholesterol concentrations (52–55). These changes are associated with enhanced atherogenesis (55). However, it has been shown that short-term ketogenic diets improve the lipid disorders that are characteristic of atherogenic dyslipidemia (56). It has also been found that sugary drinks decreased blood levels of vitamin E, thus reducing the amount of antioxidants in the body. It has been proven, beyond a doubt, that disrupting the oxidant-antioxidant status of the cell will lead to various diseases of the body (57).

The relation between a high fat diet and cancer is not conclusive. Recent epidemiological studies (17,58–60) could not explain a specific causal relationship between dietary fat and cancer. It has been found that altered energy metabolism and substrate requirements of tumour cells provide a target for selective antineoplastic therapy. The supply of substrates for tumour energy metabolism can be reduced by dietary manipulation (eg, ketogenic diet) or by pharmacological means at the cellular level (eg, inhibitors of glycolysis or oxidative phosphorylation). Both of these techniques are nontoxic methods for controlling tumour growth in vivo (61). Sugar consumption is positively associated with cancer in humans and test animals (58–61). This observation is quite logical because tumours are known to be enormous sugar absorbers. It has also been found that the risk of breast cancer decreases with increases in total fat intake (16). Further studies on the role of a ketogenic diet in antineoplastic therapy are in progress in our laboratory.

A link between low fat diets and osteoporosis has been suggested. Very low fat diets are considered to be low in calcium content. Women on low fat diets excrete most of the calcium they consume; therefore, they are more prone to osteoporosis. However, a high fat diet can rectify this situation (62).

In the present study, a control population on a low fat diet was not included due to the difficulties in recruiting subjects for a control group. However, several studies (63,64) with
appropriate control groups that compared the effect of a low fat diet with a low carbohydrate ketogenic diet have recently been published. In this regard, these two recent studies are comparable with the present study. Brehm et al (23) showed that obese women on a low carbohydrate ketogenic diet lost 8.5 kg over six months compared with 4.2 kg lost by those in the low fat diet group (P<0.001). Twenty-two subjects from the low carbohydrate ketogenic diet and 20 subjects from the low fat diet completed the study, with both groups reducing their energy intake by approximately 450 kcal from the baseline level. In another study performed in 132 severely obese subjects for six months (24), there was greater weight loss in the low carbohydrate ketogenic diet group than in the low fat diet group (5.8 kg versus 1.9 kg, P=0.002). Both of these studies support the findings presented in the present paper.

CONCLUSIONS

The data presented in the present study showed that a ketogenic diet acted as a natural therapy for weight reduction in obese patients. This is a unique study monitoring the effect of a ketogenic diet for 24 weeks. There was a significant decrease in the level of triglycerides, total cholesterol, LDL cholesterol and glucose, and a significant increase in the level of HDL cholesterol in the patients. The side effects of drugs commonly used for the reduction of body weight in such patients were not observed in patients who were on the ketogenic diet. Therefore, these results indicate that the administration of a ketogenic diet for a relatively long period of time is safe. Further studies elucidating the molecular mechanisms of a ketogenic diet are in progress in our laboratory. These studies will open new avenues into the potential therapeutic uses of a ketogenic diet and ketone bodies.

REFERENCES


