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Dr. Gabe Mirkin's Fitness and Health E-Zine

Low Salt Diets May Be Harmful

May 8, 2011

A new study from Belgium found that low- salt diets increase the risk of death from heart attacks and strokes and do not prevent high blood pressure (*JAMA*, May 4, 2011). The investigators found that the less salt people ate, the more likely they were to die of heart disease.

3,681 middle-aged Europeans with normal blood pressure and no heart disease were followed for 7.9 years. The researchers measured urine excretion of salt to prove how much salt each person took in. Virtually all salt intake during a day can be measured by how much salt ends up in the urine. This study is one of the first to measure a person's salt intake directly, rather than using dietary history which is not very dependable. However, Dr. Walter Willett of Harvard thinks that the study is flawed because investigators based their findings on a single measurement of sodium collected at the start of the study.

How could a low-salt diet cause heart attacks?

We know that salt restriction can raise blood sugar and insulin levels, while salt loading lowers them (*American Journal of Hypertension*, July 2001).

- A low-salt diet can cause salt deficiency which blocks insulin receptors.
- This prevents the body from responding to insulin.
- This causes the pancreas to release huge amounts of insulin.
- High levels of insulin constrict arteries leading to the heart to cause heart attacks.

Salt deficiency can cause the side effects of diabetes

Blocked insulin receptors:

- prevent insulin from removing sugar from the bloodstream to cause
- high blood sugar levels.
- This causes sugar to stick to cells.
- Once sugar is stuck on a cell, it can never get off, and is eventually converted to a poison called sorbitol that destroys the cell, to cause all the side effects of diabetes: blindness, deafness, dementia, heart attacks, strokes, impotence, nerve damage and so forth.

Who should restrict salt?

Most doctors feel that non-exercising North Americans should restrict salt, particularly those who already have high blood pressure and/or heart problems. Extra salt can raise blood pressure slightly and cause fluid retention that can stress the heart. Therefore, it is reasonable for doctors to prescribe a low-salt diet to non-exercisers, provided that they also recommend that their patients follow the DASH Diet: <http://www.drmirkin.com/heart/8614.html>

Why doctors should always recommend the dash diet with salt restriction:

Most people cannot stay on a low-salt diet and many researchers have shown that salt restriction lowers high blood pressure only a little, while the DASH Diet (high in vegetables and fruit) lowers high blood pressure dramatically. Reducing salt intake a little does not lower high blood pressure (*JAMA*, May 21, 1996) and reducing salt intake a lot can raise blood pressure even higher (*JAMA*, May 6, 1998).

Severe salt restriction causes your adrenal glands to produce large amounts of a hormone called aldosterone, and your kidneys to produce large amounts of another hormone called angiotensin. Both constrict blood vessels and raise blood pressure. People on severe low-salt diets have a higher death rate, and severe salt restriction can raise blood pressure and blood cholesterol, and even cause heart attacks (*American Journal of Hypertension*, October 1994).

Obese people are the ones most likely to be able to lower blood pressure with salt restriction. However, being overweight prevents your body from responding adequately to insulin and raises insulin levels. Since insulin causes the body to retain salt, salt restriction raises blood levels of insulin which make a person hungrier and fatter. Eating white flour and sugar makes your body much more sensitive to salt, and restricting these food products decreases salt's ability to raise blood pressure. Changing your lifestyle is far more effective in reducing high blood pressure than just taking drugs.

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How can you reduce your chances of salt harming you?

Many different co-factors increase your risk for heart attacks, strokes, and diabetes. You can reduce your susceptibility to these diseases by losing excess weight, exercising, avoiding refined carbohydrates (particularly sugared drinks and foods and bakery products and pastas made from flour), avoiding red meat, raising your blood vitamin D3 level above 75 nmol/L, not smoking and taking no more than one alcoholic drink a day.

What if you already suffer from high blood pressure or heart disease?

If you have high blood pressure, you may be able to lower your blood pressure to normal by going on the high-plant DASH diet. If you suffer heart disease or fluid retention, you may also benefit from salt restriction. Salt restriction plus the DASH diet is more effective in lowering high blood pressure than just the DASH Diet alone (*NEJM*, January 4, 2001).

Who should think twice about restricting salt?

Intense exercisers can be harmed by salt restriction. During my residency training, I had the good fortune to hear lectures on fluids and electrolytes given by Dr. James Gamble of Harvard Medical School. He performed the definitive studies on minerals and exercise during World War II. Some of my instructors had been Harvard Medical School students who were paid by Dr. Gamble to lie on a raft in his swimming pool, take various amounts of fluids and salt and have blood drawn to measure salt and mineral levels.

Dr. Gamble showed that you have to take a lot of salt when you exercise for several hours, particularly in hot weather. For many years after that, every student at Harvard Medical School heard Dr. Gamble give his lectures on minerals and exercise, and today, most serious students still read the Gamble lectures published in 1958 by The Harvard University

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Press. Now, more than sixty years later, nobody has improved on his research.

Why so much fuss about salt restriction?

After Gamble published his studies, people who worked or exercised in the heat were given salt tablets. Then doctors became concerned because they thought that a person could have his blood pressure raised by taking in too much salt, and some people vomited because of the high concentration of salt (from salt pills) in their stomachs. So they recommended restricting salt, causing people to suffer heat stroke and dehydration during hot weather exercise.

A low-salt diet does not lower high blood pressure for most people. A high-salt diet causes high blood pressure usually only in people with high blood insulin levels. Eating salty foods and drinks when you exercise for more than two hours is unlikely to raise blood pressure. We don't recommend salt tablets because they can cause nausea and vomiting.

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Why intense exercisers need extra salt:

The only mineral that you need to take during prolonged exercise is sodium, found in regular table salt. Potassium, calcium and magnesium deficiency do not occur in healthy athletes (*Medicine & Science in Sport & Exercise*, October 1999).

How can you tell that you may be salt deficient?

If you are a regular exerciser who is on a low-salt diet and you feel fatigued, or develop muscle aches or injuries, get a blood sodium test. If your blood sodium is low, you need to take in more salt before you harm yourself more seriously.

How I almost died from a low salt syndrome:

In 1967, Tom Osler, a virtually unknown math professor at Glassboro State, won the United States National AAU 30-Kilometer running championship in 100 degree weather in Rockville, Maryland. This was incredible because he had no basic speed, yet he beat many of the best runners in the country. He was a mediocre runner in cold weather and attributed his phenomenal success in hot weather to restricting salt from his diet. The theory seemed reasonable. When you compete in the heat, you lose tremendous amounts of water and salt. Could restricting salt and water teach your body to conserve salt and water during competition? I tried it and suffered heat stroke in a road race in July in Washington, DC.

Research shows that restricting either salt or fluid during training will not increase endurance. It tires you earlier so you can't train. Furthermore, salt deficiency causes a syndrome in which your muscles hurt all the time, and you suffer cramps, headache and extreme tiredness.

The most crucial factor in preparing your body for competition in the heat is exercising in the heat (Aviation Space and Environmental Medicine, August 1995). Restricting fluids does not help your body to acclimatize better. Several studies show that water loading and salting your food to taste help you to compete. Markedly increasing your intake of fluids for a week before competition can increase your endurance. The extra salt helps your body to hold the extra water.

How can you meet your needs for salt when you compete in endurance events in very hot weather?

Just about everyone agrees that you need to take in drinks and foods containing extra salt during extended athletic competitions in hot weather. Not everyone agrees that athletes need to take in extra salt at rest. If you don't take salt and fluids during extended exercise in hot weather, you will tire earlier and increase your risk for heat stroke, dehydration and cramps. You can drink special electrolyte drinks, or eat salted foods along with any fluid during competition.

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