

Eat Bananas And Stop Heart Disease: Low Dietary Intake Of Both Potassium And Magnesium Can Drastically Increase Risk Of Heart Disease



Liv Pollock
Biochemistry Program, Beloit College, Beloit, WI

Abstract:

The objective of this poster is to research the correlation between magnesium (Mg) and potassium (K) intake and the presence of heart disease. My hypothesis was that good daily intake levels of K and Mg especially at a young age are essential to prevent heart disease. Much research has shown that there is a direct connection. The levels of these elements have a great effect on the structure and function of the myocardium. The myocardium is the portion of the heart that is made up of tissue. Without normal levels the occurrence of sudden cardiac death is much higher.

In the US the average daily intake levels of both Mg and K are significantly lower than what is recommended, which is approximately 310-420mg for adults. A recent study has shown that 68% of adults in the US consumed less than the RDA for Mg. It also stated that 19% consumed less than half of the RDA for Mg. The importance of both Mg and K to the body is undeniable for many reasons, including the fact that K has one of the highest RDAs of both vitamins and minerals.

Introduction:

The importance of the daily intake of both K and Mg is vital to a healthy heart. This poster presents the effects of very low levels of K and Mg. Gitelman's syndrome is an inherited metabolic syndrome that prevents the retention of both Mg and K in the system, so supplements must be taken to maintain regular levels. Maintaining high levels is essential to the average college student more so than the rest of the population because of the likelihood of unhealthy lifestyles. There are many things that have negative effects on the levels of Mg and K like a poor diet, a large and regular consumption of alcohol and other lifestyle choices (1).

The myocardium is the portion of the heart that is most effected by a lack of Mg and K. The myocardium is the tissue that makes up the heart. Maintaining regular levels are very important to its structure and function. Denying the myocardium of either of these elements can lead to coronary heart disease and/or sudden death (3). The average American consumes much less Mg and K than the standard recommendation. For example the Mg RDA (Recommended Dietary Allowance) for men and women ages 30+ is 420mg and 320mg (8). That being the case another source stated that the average daily intake for men is 320mg and for women it is 233mg (2). This significant information is unknown to many people and could be a major factor contributing to heart disease in this country.

Method:

I was able to ascertain my information about appropriate Mg and K levels by reading and researching a variety of peer-reviewed articles, case studies, and other in-depth surveys.

Chart 1: RDA for potassium in mg/day

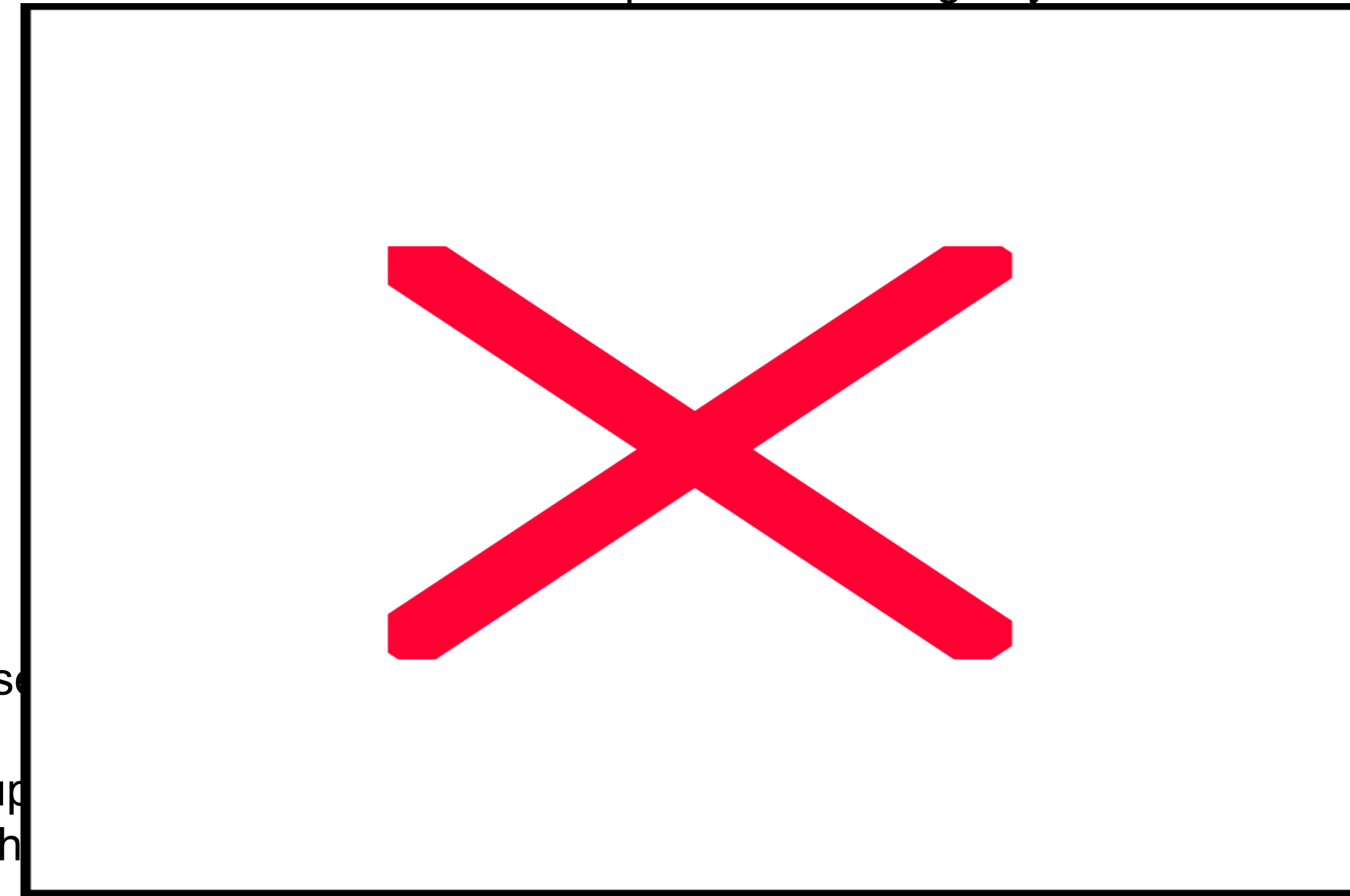


Chart 2: RDA for magnesium in mg/day

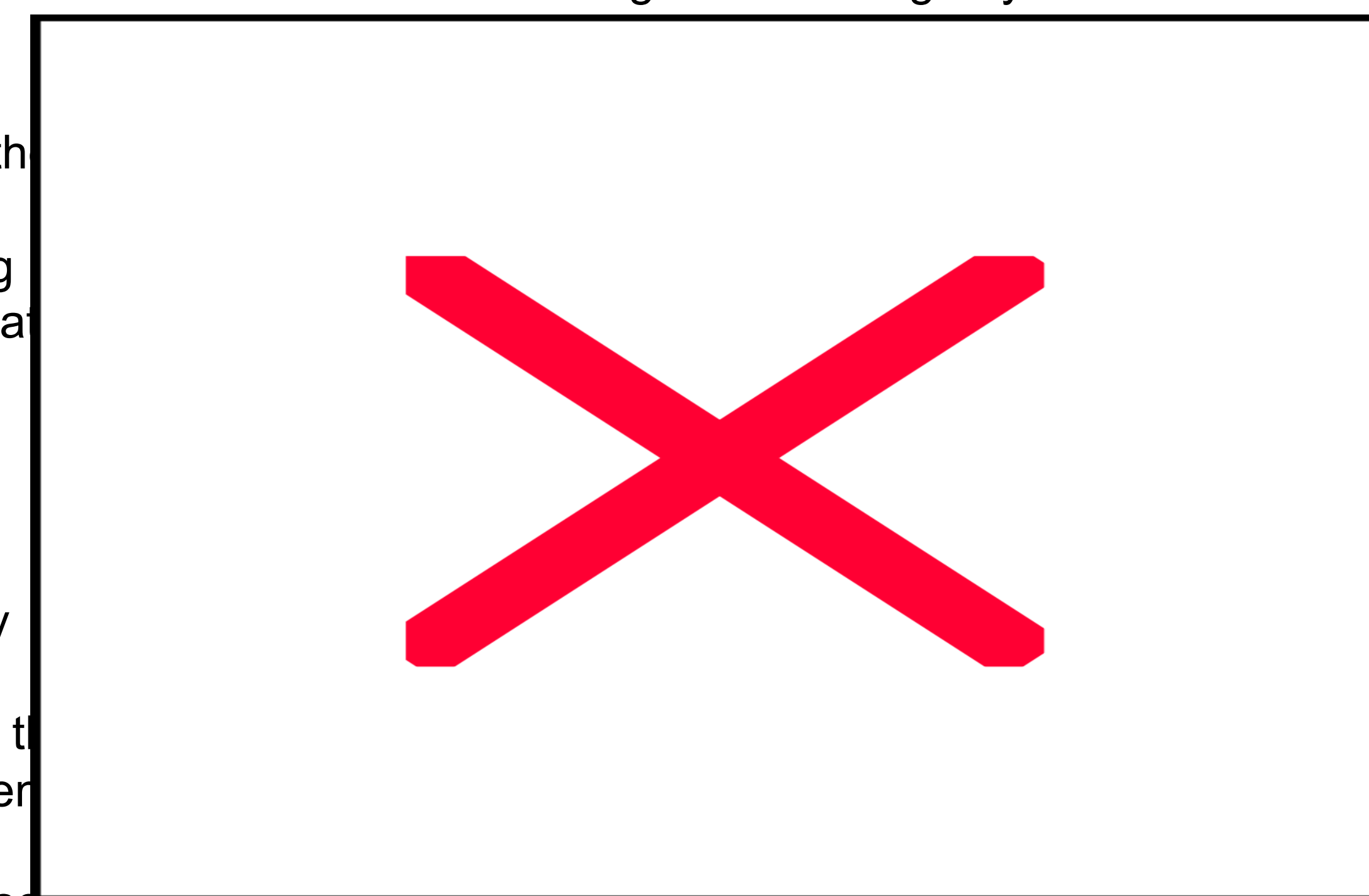


Table 1: The effects of Mg and K on the body

Potassium	Magnesium
Deficiency Reactions	Deficiency Reactions
1.Muscle Weakness 2.Paralysis 3.Confusion	1.Confusion 2.Irregular Heartbeats 3.Weakness 4.Muscle Contractions
Main Functions	Main Functions
1.Helps fluid and electrolyte balance 2.Helps with Chemical Reactions 3.Assists in Nerve Function 4.Supports Cell Integrity	1.Immune Function 2.Helps with Muscle Contractions 3.Nerve Function 4.Tooth Maintenance

Good Potassium-Rich Foods	Good Potassium-Rich Foods
1.Bananas 2.Orange Juice 3.Baked Potatoes 4.Salmon 5.Avocados 6.Lima Beans 7.Honeydew Melons	1.Yogurt 2.Soy Milk 3.Bran Cereal 4.Oysters 5.Black-Eyed Peas 6.Spinach

Table 2: How much of the RDA are you getting from eating magnesium- and potassium-rich food?

Type of Food	Serving Size	Magnesium Levels In Serving of Food	Percentage of Magnesium RDA Adult Woman's Mg. RDA = 320mg	Percentage of Magnesium RDA Adult Man's Mg. RDA = 420mg	Potassium Levels in Serving of Food	Percentage of Potassium RDA K. RDA = 4700mg (same for adult men and women)
Oysters	3 Ounces	37mg	11.6%	8.8%	257mg	5.5%
Yogurt	1 Cup	32mg	10%	7.6%	434mg	9.2%
Soy Milk	1 Cup	46mg	14.4%	11%	338mg	7.2%
Black-Eyed Peas	½ Cup	43mg	13.4%	10.2%	345mg	7.3%
Spinach	½ Cup	82mg	25.6%	19.5%	375mg	8%
Bran Cereal	1 Cup	200mg	62.5%	47.6%	700mg	14.9%
Avocado	1 Avocado	73mg	22.8%	17.4%	1067mg	22.7%
Banana	1 Banana	32mg	10%	7.6%	422mg	9%
Lima Beans	½ Cup	63mg	19.7%	15%	485mg	10.3%
Honeydew Melons	½ Cup	9mg	2.8%	2.1%	203mg	4.3%
Orange Juice	½ Cup	14mg	4.4%	3.3%	248mg	5.3%
Baked Potatoes	1 Potato	55mg	17.2%	13.1%	844mg	18%
Salmon	3 Ounces	27mg	8.4%	6.4%	377mg	8%

Results:

The depletion of Mg in the blood, serum, and urine coincided with a lack of dietary Mg. and both blood and serum have great effect of the function of the heart. These low levels of Mg also had a significant connection with the occurrence of supraventricular beats or irregular heart beats. (5).

Of 39,633 men surveyed, there was a total of 1,449 cases of coronary heart disease (CHD), and 428 of them were fatal. Men with a much higher total Mg intake had a much lower risk of CHD (6).

The study below split people into two groups. The goal was to explore the effect of daily Mg supplements on coronary heart disease (CHD) and sudden cardiac death prevention.

Group A
Intake of Mg: 1,142 ± 233mg/day

Occurrence of Complications:
59 or 28.6%

Mortality Rate:
22 or 10.7%

Sudden cardiac deaths were 150% more common in Group B than in Group A. This study clearly proves that a magnesium-rich diet can either prevent or decrease the risk of heart disease and sudden death (7).

There are significantly lower levels of Mg and K in the myocardial tissue of people who die from ischemic heart disease (4).

Group B
Intake of Mg: 418 ± 105mg/day

Occurrence of Complications:
117 or 60.3%

Mortality Rate:
34 or 18%

Discussion:

It is important to get the appropriate amount of both Mg and K, especially at a young age. The high occurrence of coronary heart disease and sudden cardiac death could be caused by the fact that the average intake in this country of both Mg and K is much lower than the recommended levels. By simply being aware of the Mg. and K. content of your food or taking supplements, one could decrease the risk and even prevent oncoming heart disease.

References:

- Flink, EB. "Magnesium deficiency in alcoholism" PubMed. Vol. 10, No. 6: 590-94. December 1986. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=3544909&dopt=Citation.
- Ford, Earl S., Mokdad, Ali H. "Dietary Magnesium Intake in a National Sample of U.S. Adults" The Journal of Nutrition. Vol. 133, 2879-2882. 2003.
- "Intake of Potassium, Magnesium, Calcium, and Fiber and risk of stroke among US men" American Heart Association, Chicago Investigation and reports. Circulation: 1198-1204, 1198. www.circ.ahajournals.org/cgi/content/abstract/98/12/1198.
- Johnson, CJ, Dr. Peterson, EK Smith. "Myocardial tissue concentrations of magnesium and potassium in men dying suddenly from ischemic heart disease" The American Journal of Clinical Nutrition. Vol. 32, 967-970. 1979. <http://www.ajcn.org/cgi/content/abstract/32/5/967>.
- Klevay, Leslie M., Milne, David B. "Low dietary magnesium increases supraventricular ectopy" The American Journal of Clinical Nutrition. Vol. 75, No. 3, 550-554. March 2002. www.ajcn.org/cgi/content/abstract/75/3/550.
- "Magnesium intake and risk of coronary heart disease among men" The journal of the American college of nutrition. Vol. 23, No. 1, 63-70. 2004. <http://www.jacn.org/cgi/content/abstract/23/1/63?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=magnesium+intake+and+risk+of+coronary+heart+disease+among+men&andorexactfulltext=and&searchid=1&FIRSTINDEX=0&sortspec=relevance&resourcetype=HWCIT>.
- RB, Singh. "Effect of dietary magnesium supplementation in the prevention of coronary heart disease and sudden cardiac death" PubMed. Vol. 9, No. 3: 143-51. 1990. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=91063948&dopt=Citation.
- Sizer, Frances, Whitney, Ellie. Nutrition; concepts and controversies. 10th ed. Thomas Wadsworth 2006.