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Do Vegetarians Live Longer Than Health Conscious Omnivores?

By Travis

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Featured Recipes

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- Chickpea and Sweet Potato Satay
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I have made the following suggestions be taken by the Medical Board of California in support of this law:

1. Require continuing medical education (CME) on meaningful diet-therapy* for all newly licensed and relicensed physicians,
2. Require California's 11 medical schools to teach diet-therapy,
3. Require the 393 general acute care hospitals in California to dedicate significant time to diet-therapy at ongoing educational meetings held for their doctors,
4. Audit medical practices for the appropriate use of diet-therapy (similar to what is now performed with drug and surgery therapies), and
5. Send nutritional education materials to physicians on diet-therapy.

* Dr. McDougall understands that there are various kinds of diets used to prevent and treat diseases, ranging from fully plant-food-based to fully animal-food based diets. Presently, medical students and practicing doctors have no practical knowledge about human nutrition and its effects on their patients' health. Physicians' training is largely limited to drug and surgical treatments. Paradoxically, food is the cause of almost all chronic illnesses in Western societies. In general, Dr. McDougall believes that a healthful diet for people should include more whole plant-derived foods, and fewer animal-derived and processed foods.

The California Medical Board's Action Plan, — approved on February 6, two and a half years after SB 380 was signed into law — includes:

1. … a webpage be created on the Board's website that will be a clearinghouse of information for physicians and consumers related to chronic disease prevention.
2. The Board can send an email blast out to all physicians…and also include at least two articles on this subject per year in the Board's Newsletter.
3. Staff has also reached out to the University of California (UC) to get more information on what is being taught to medical students regarding nutrition and lifestyle behavior.
4. Lastly, Board staff recommends that the Board begin discussing the standards for educational activity concerning chronic disease with organizations that accredit CME programs.

In my (Dr. McDougall's) opinion the Action Plan does not reflect the urgency necessary to address the devastating health problems facing our society.

I estimate that in California alone, over the past two and a half years since SB 380 was signed into law:

- $237 Billion has been misspent on preventable and treatable dietary diseases,

- 3,040,000 people have remained diabetic unnecessarily,
- 26,000,000 people became or remained overweight and/or obese,
- 1,504,000 children have become or have remained obese,
- 1,509,000 children have become or have remained overweight,
- $27 billion has been spent for angioplasty surgeries for diet-caused heart disease,
- $13 billion has been spent for bypass surgeries for diet-caused heart disease.

*9,435,682 children along with 38 million people live in California

John McDougall, MD's* 120 Seconds of Testimony before the Medical Board of California (on February 6, 2014)

*John McDougall, MD is a Board Certified Internist practicing at The McDougall Health and Medical Center in Santa Rosa,CA and is a national-bestselling author.

Wayne Dysinger, MD, MPH Encourages the California Medical Board To Do More with SB 380 (February 6, 2014)

*Wayne Dysinger, MD, MPH is the Chair of the Department of Preventive Medicine and is the Director of the Lifestyle Medicine Track of the Family and Preventive Medicine Residency at Loma Linda University, and was the Director of the Lifestyle Medicine Institute.

What Should We Do Next?

If you would like to help ensure that new programs fulfill the intent and letter* of California Senate Bill 380, on local, state, and federal levels, please petition your government officials with your concerns and suggestions. Write (e-mail) your state medical boards about this serious matter of inadequate knowledge about the effects of food on physicians' patients. Write (e-mail) to medical schools.

Send them a demand that medical doctors be taught what human beings are supposed to eat for good health. Your actions may stem the tide of diseases, including obesity, heart disease, stroke, diabetes, indigestion, and constipation. Relieving the financial burdens from these dietary diseases can reverse economic ruin for individuals and governments, overnight; as well as immediately slow global warming.

*Section 2 of SB 380: "In order to ensure the continuing competence of licensed physicians and surgeons, the board shall adopt and administer standards for the continuing education of those licensees. The board may also set content standards for any educational activity concerning a chronic disease that includes appropriate information on prevention of the chronic disease, and on treatment of patients with the chronic disease, by the application of changes in nutrition and lifestyle behavior. The board shall require each licensed physician and surgeon to demonstrate satisfaction of the continuing education requirements at intervals of not less than four nor more than six years."

Do Vegetarians Live Longer Than Health Conscious Omnivores?

By Travis

In the February, May and August 2013 McDougall newsletters, I presented readers with articles addressing the dangers of low-carb and Paleo diets. Please take this opportunity to read these articles.

Although the question as to whether a plant-based diet extends life expectancy is likely determined by the quality of foods used to replace animal foods, numerous proponents of low-carb and Paleo

diets have claimed that diets that exclude flesh do not favor longevity, and are even likely to promote premature death. Whenever health benefits are observed in vegetarians, these proponents have often simply attributed this to other healthy aspects of a vegetarian lifestyle, unrelated to abstention from meat.

In this article, I examine a number of these concerning claims, and review the literature addressing the life expectancy of vegetarians and health conscious omnivores. In addition, I address a number of important limitations of studies carried out on vegetarians, and in particular, how paradoxical findings can result as the consequence of participants adopting a vegetarian diet in response to deteriorating health.

It is not news that Denise Minger has a tendency to downplay the health benefits of plant foods and plant-based diets. In her critique of the China Study, Minger claimed that "as a plant-nosher", she was hoping to find evidence to support Dr. T. Colin Campbell's findings from the China Study linking dietary fiber to lower rates of colorectal cancer.[1] Somehow, however, despite her vegan bias apparently creeping into her critique, Minger suggested that she was unable to find sufficient evidence outside of the China Study supporting the hypothesis that dietary fiber protects against colorectal cancer. And yet, several months later the omnivorous panel of experts of the World Cancer Research Fund concluded based on a review of over 1,000 publications that there was convincing evidence that dietary fiber protects against colorectal cancer.[2] In Death By Food Pyramid, Minger continues this trend of downplaying the health benefits of plant-based diets.

Failing to Equal the Seventh-day Adventists

In the chapter of her book, Herbivore's Dilemma, Denise Minger provides a brief overview of the history and the growth of the popularity of vegetarian diets, bringing into picture the earliest of the studies on the Californian Seventh-day Adventists. Loma Linda, California which is highly concentrated by Adventists is considered to be a Blue Zone because of the greater life expectancy compared to other parts of North America. Loma Linda shares the title of Blue Zone with four other populations which are all characterized by traditionally consuming plant-based diets, typically rich in legumes and grains.[3] These other Blue Zones include, Ikaria, Greece; Nicoya, Costa Rica; Okinawa, Japan; and Sardinia, Italy. It seems that Minger was not even able to get these simple details right in her book, claiming that the Greek island of Crete is considered a Blue Zone, while citing an article that clearly refers to Ikaria.

Minger hypothesizes that the longevity of the Adventists maybe unrelated to their low meat diet,

and may rather reflect the discouraged use of tobacco and alcohol. To illustrate this, Minger points out that the Mormons who are also discouraged from the use of tobacco and alcohol, "but whose founder never endured any meat-abstinence visions"[p.194] have a greater life expectancy than the average population. Although Joseph Smith, Jr., the founder of Mormonism may not have demanded followers to completely abstain from meat, the Word of Wisdom (section 89 in The Doctrine and Covenants) which he delivered, apparently received as a revelation from god, states that:4

Yea, flesh also of beasts and of the fowls of the air, I, the Lord, have ordained for the use of man with thanksgiving; nevertheless they are to be used sparingly;

In regards to longevity, Minger then goes onto state that:

But what's even more telling is the fact that meat-eating Mormons and vegetarian Adventists tend to live equally as long. When compared to ethnically matched folks outside their religious groups, both Adventist and Mormon men—once their birthday-cake candles start numbering in the thirties—can expect to live about seven years longer than the rest of the population.[p.194]

Unlike what Minger appears to have the reader believe, the 7 years greater life expectancy referred to in the study she cites is for the average Adventist male, and not specifically for vegetarian Adventist men. Less than one third of the men in the cited study were considered vegetarians, with more than half considered regular meat eaters.5 What these studies specifically found was that the life expectancy for active Mormon men who reached the age of 35 was about 7.5 years greater than the average U.S. white male, whereas the life expectancy of the average Californian Seventh-day Adventist male who reached the age of 30 was about 7.3 years greater than the average Californian white male.5 6 When specifically looking at the average vegetarian Californian Adventist male, their life expectancy was found to be about 9.5

years greater than the average Californian white male. It is important to note that the Californian whites that the Adventists were compared to have one of the highest life expectancies of any American state, and are expected to live up to a year longer than the average U.S. white that the Mormons were compared to.7

The more recent 25 year follow-up of the Mormons may allow for a more informative comparison, as like the Adventist study, it included both men and women from California, and examined the effects of other lifestyle factors on mortality. Mormon men and women over the age of 25 with four favorable lifestyle factors associated with significantly reduced mortality were expected to live about 9.8 and 5.6 years longer, respectively, compared to U.S. whites.8 In comparison, vegetarian Adventist men and women over the age of 30 with three favorable lifestyle factors were expected to live about 13.2 and 8.9 years longer, respectively, compared to non-Adventist Californians whites.5 9 Compared to the average U.S. white however, this difference in life expectancy would be expected to be closer to about 14 and 10 years.7 However, and more importantly, a later paper on the Californian Adventists found that those who adhered to a vegetarian diet for at least 17 years were expected to live 3.6 years longer than those who adhered for fewer years.10 This suggests that when restricting the analysis to long-term vegetarian Adventists, the difference in life expectancy compared to the Mormons would be even greater.

There are also other lines of evidence lending support to the observed greater life expectancy of the vegetarian Seventh-day Adventists compared to health conscious Mormons. For example,

one study in which vegetarian Adventists and Mormons were matched for strength of religious affiliation, and consumption of tobacco, alcohol, tea and coffee, the vegetarian Adventists were found to have significantly lower levels of serum cholesterol, blood pressure and rates of obesity (Fig. 1).[11] [12] The difference in blood pressure remained significant even after controlling for BMI, and could not be explained by differences in sodium intake. Another study also found that vegetarian Adventists had lower blood pressure than Mormons, and that the difference increased with age, suggesting a greater favorable effect of long-term adherence to a flesh-free diet.[12]

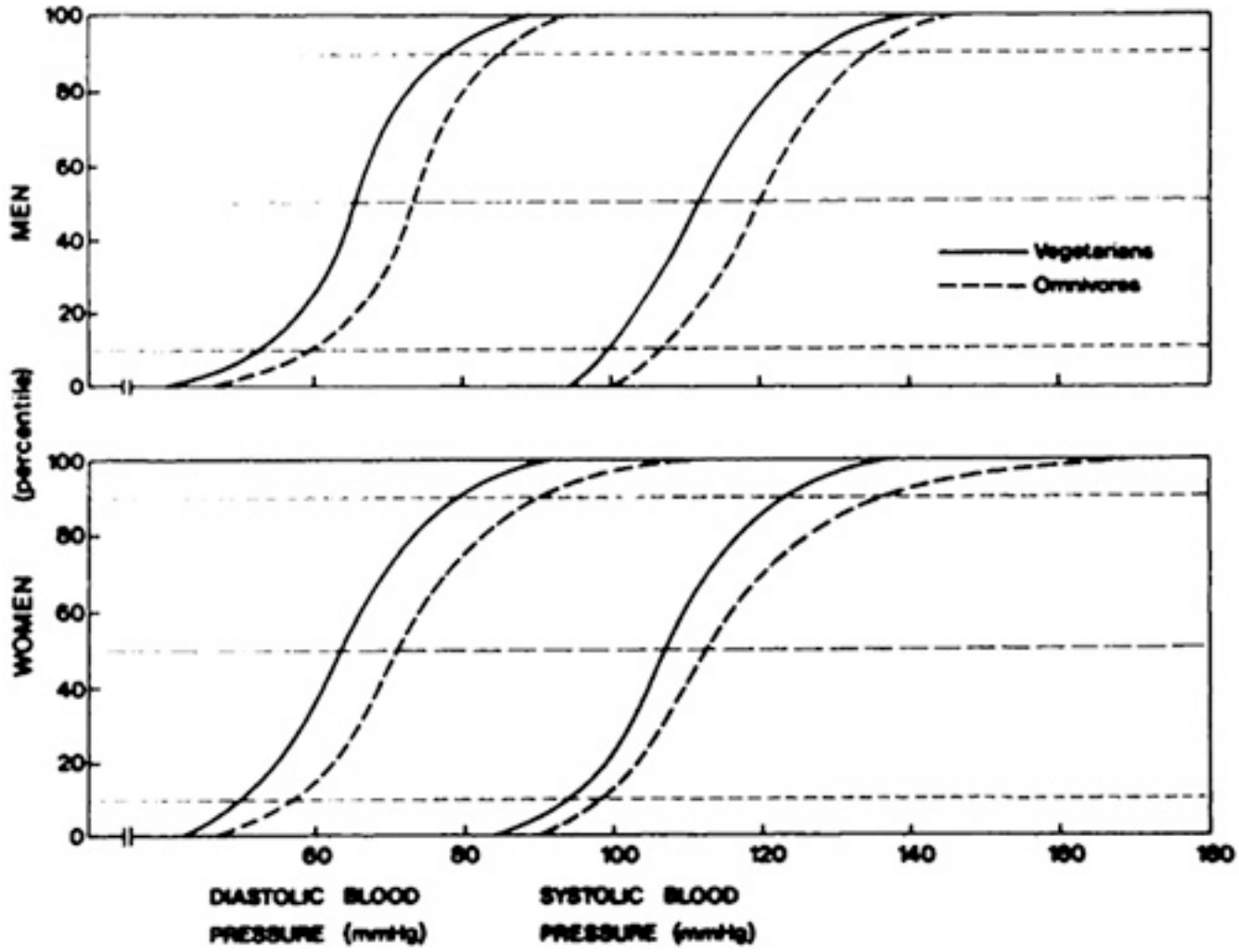


Figure 1. All percentiles of distribution of blood pressure were found to be lower in the vegetarian Adventists compared to health conscious omnivorous Mormons.

Although some of the many factual errors in Minger's book may be passed off as sloppy research rather than as being intentional (one example perhaps being when she confuses Crete for Ikaria), given the number of occasions she has discussed the Adventist studies previously, it is difficult to believe that she was truly being honest and simply was not even aware of the data in the very studies she cites. Furthermore, Minger acknowledges in this book that she had others with knowledge in this field review her manuscript and assist her with the completion of this book (almost exclusively individuals who have demonstrated an anti-vegetarian stance), allowing for little excuse for these misleading statements.

Mortality in Vegetarians and Health Conscious Omnivores

As there are no published meta-analyses examining all of the current available prospective cohort studies comparing mortality in vegetarians and health conscious non-vegetarians, I performed a simple meta-analysis using the results for the fully adjusted model from the most recent follow-up of each cohort. For mortality from all-causes, based on 7 cohorts, the vegetarian group had a statistically significant 7%, and a borderline significant 6% reduced risk, using the fixed effects and random effects models, respectively (Fig. 2).[10 13 14 15 16] The 6 cohorts that stratified data by sex suggested an even stronger protective effect of a vegetarian diet for men.[16 17]

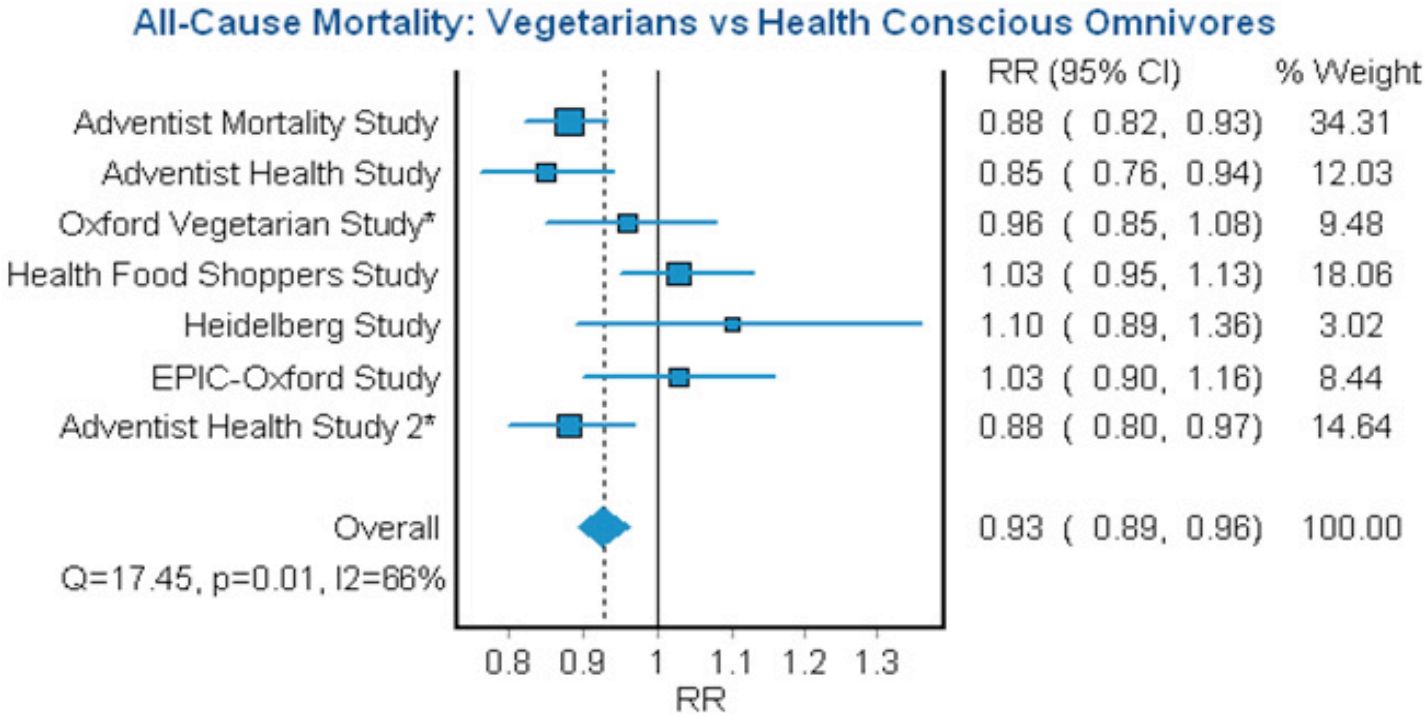


Figure 2. All-cause mortality for vegetarians compared to health conscious non-vegetarians in a meta-analysis using the fixed effects model.

*Indicates that participants classified as semi-vegetarians were included in the vegetarian group

It should be stressed that the meat intake in the non-vegetarian group in most of these studies was significantly lower than that of the general population. As described in a different review, the selection criteria for the non-vegetarians in these studies generally included being affiliated with vegetarians in some way or another, likely explaining their relatively low meat intakes. Furthermore, evidence suggests that many of the self-proclaimed vegetarians in these studies actually consumed meat on a regular basis, resulting in minimal differences in meat intake between the groups.[10]

Considering the lack of difference in meat intake between the vegetarian and non-vegetarian groups, it would only be expected that these studies would not have the statistical power to demonstrate a significant benefit of a vegetarian diet. Two studies which may be considered as especially having limited statistical power due to such limitations were the Heidelberg Study and Health Food Shoppers Study. In the Heidelberg Study, the non-vegetarian group were predominantly semi-vegetarians, while in the Health Food Shoppers Study, a validity assessment of the survey used to classify the participants vegetarian status suggested that 34% of the participants classified as vegetarians actually consumed meat. In fact, a slightly greater percentage of participants classified as vegetarians in the Health Food Shoppers Study were found to consume meat 3 or more times a week than the non-vegetarians in the Heidelberg Study (7.6%

and 6.9%, respectively).[14] [18] Taking this into consideration, I performed a sensitivity analysis excluding either the Heidelberg Study or Health Food Shoppers Study from the meta-analysis. Excluding the Health Food Shopper Study alone reduced heterogeneity and strengthened the association between vegetarian status and a reduced risk of mortality from all-causes (RR 0.91 [95% CI, 0.87-0.94], and 0.92 [95% CI, 0.86-0.98] using the fixed effects and random effects model, respectively).

Most of these studies did not provide separate data for length of adherence to a vegetarian diet. As already described earlier in this review, evidence from several of these studies suggest a stronger effect on mortality would have been observed if the analysis was restricted to long-term vegetarians.10 Another important limitation was that most studies also did not verify changes to vegetarian status of the participants throughout the follow-up, which may in part explain why the association between a vegetarian diet and a reduced risk of mortality weakened over time in several of the studies.[9] [10]

Another important potential limitation of these studies described in detail in the next section, is that some of the participants likely adopted a vegetarian diet in order to improve poor health, such as symptoms of an undiagnosed or developing illness that would ultimately became fatal. Each of these limitations described are expected to have either biased these findings towards null, or even in favor of the non-vegetarian group, suggesting that the findings of this meta-analysis may have significantly underestimated the benefits of an appropriately planned vegetarian diet.

In order to determine which factors may have contributed to the observed reduced risk of death in vegetarians, I also performed separate meta-analyses for the major causes of death. This included mortality from coronary heart disease and cardiovascular disease, and the incidence of all cancers combined. For mortality from coronary heart disease, based on 7 cohorts, the vegetarian group had a statistically significant 25% and 24% reduced risk, using the fixed effects and random effects models, respectively (Fig. 3).[13] [14] [15] [16] [17] For mortality from cardiovascular disease, based on 7 cohorts, the vegetarian group had a statistically significant 17% and 14% reduced risk, using the fixed effects and random effects models, respectively (Fig. 4).[13] [14] [15] [16] [17] For the Adventist Mortality Study and Adventist Health Study, mortality from cardiovascular disease was derived from pooling the relative risk for mortality from coronary heart disease and stroke.[17] Excluding the Adventist Mortality Study and the Adventist Health Study, the vegetarian group had a statistically significant 8% reduced risk of mortality from cardiovascular disease, using both the fixed effects or random effects model (0.92 [95% CI, 0.85-0.99]).

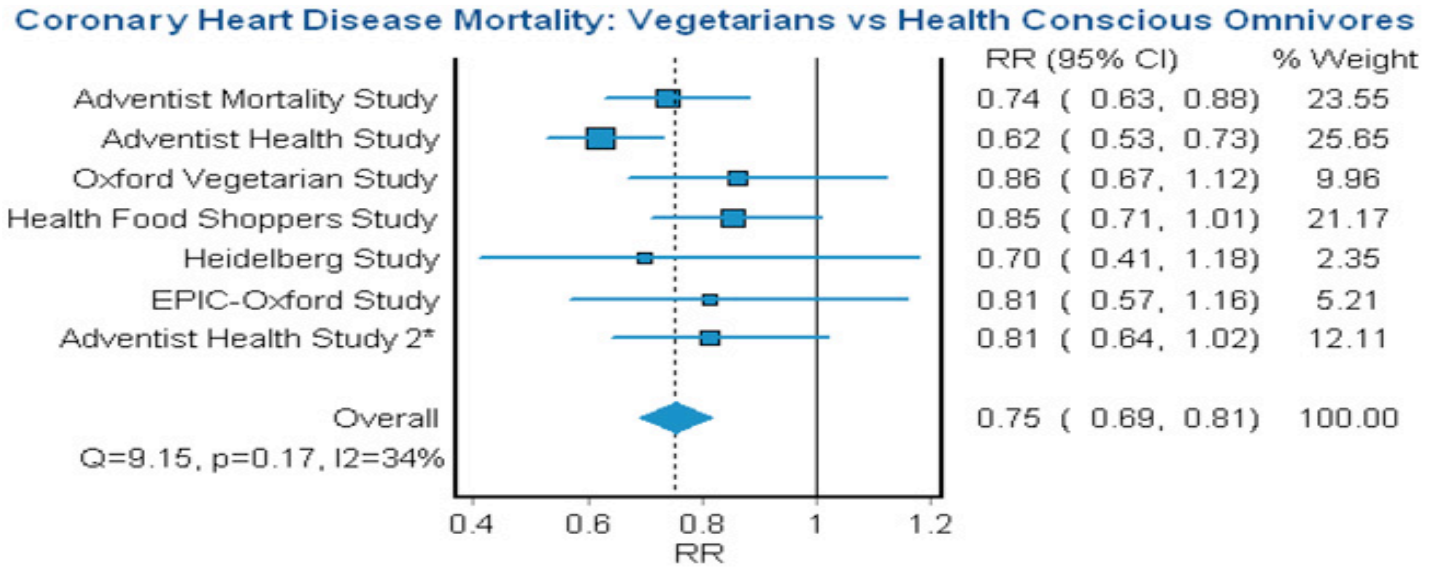


Figure 3. Coronary heart disease mortality for vegetarians compared to health conscious non-vegetarians in a meta-analysis using the fixed effects model.
*Indicates that participants classified as semi-vegetarians were included in the vegetarian group

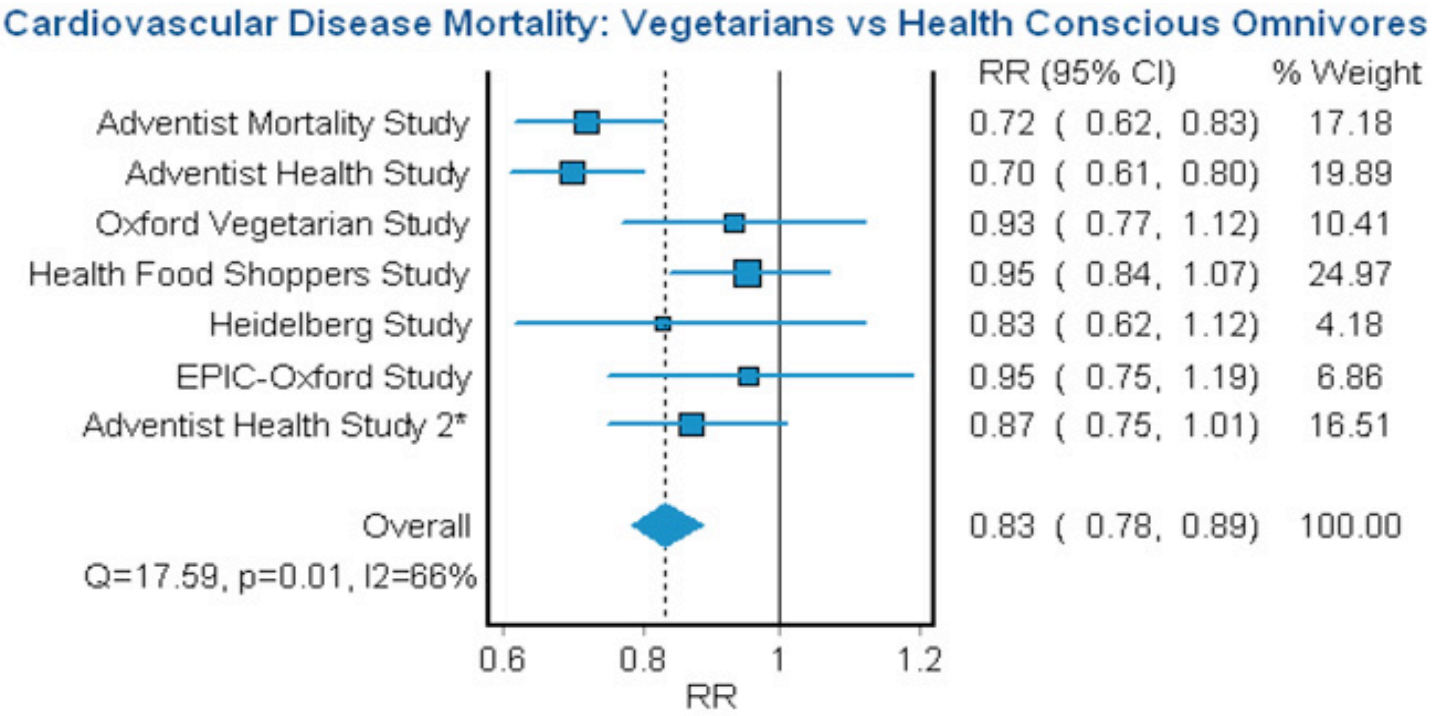


Figure 4. Cardiovascular disease mortality for vegetarians compared to health conscious non-vegetarians in a meta-analysis using the fixed effects model.
*Indicates that participants classified as semi-vegetarians were included in the vegetation group

As described in a previous review, the degree of reduction in risk of mortality from coronary heart disease observed in vegetarians in these cohort studies was generally in proportion to the expected reduced risk based on the differences in levels of total and non-HDL cholesterol, and blood pressure. There is a plethora of evidence, not only from epidemiological studies, but not only from epidemiological studies, but also clinical trials that plant-based diets and nutrients have favorable effects on total and LDL cholesterol, blood pressure, among several other factors which are established risk factors for cardiovascular and all-cause mortality.[19] [20] [21] [22]

In the Oxford Vegetarian Study, high compared to low intake of saturated animal fat was associated with a nearly 3-fold increased risk of coronary heart disease mortality.[23] Similarly, in a meta-analysis of 11 cohort studies, high compared to low intake of saturated fat was associated with a 32% increased risk of coronary heart disease mortality, despite the inclusion of over-adjustments for dietary and serum lipids.[24] It was also found in the Oxford Vegetarian Study that high compared to low intake of total animal fat and dietary cholesterol was associated with a greater than 3-fold increased risk of coronary heart disease mortality.[23] Furthermore, evidence from thousands of experiments carried out over the last century have shown that the feeding of dietary cholesterol and saturated fat has accelerated the development of atherosclerosis in virtually every animal species in which researchers were able to find a method to sufficiently elevate cholesterol concentrations. This includes herbivores, omnivores and carnivores from mammalian, avian and fish species, and over one dozen different species of nonhuman primates.

In both the Oxford Vegetarian Study and the Adventist Mortality Study, high compared to low intake of eggs was associated with an increased risk of coronary heart disease mortality.[23 25] However, for ill-defined reasons, these studies were excluded from several recent meta-analyses. In the Adventist Mortality Study and Heidelberg Study, high compared to no intake of meat was associated with a 50% and almost 5-fold increased risk of coronary heart disease mortality, respectively.[14 25] Similarly, in the Adventist Health Study, high compared to no intake of beef was associated with a greater than 2-fold increased risk for men.[26] In addition, recent meta-analyses of prospective cohorts found that an increment of 1 mg/day of heme iron, found only in animal tissue, is associated with a 16% and 27% increased risk increased risk of type II diabetes and coronary heart disease, respectively.[27 28] Therefore, the totality of evidence strongly suggests that the observed greater longevity of vegetarians can be explained, at least in part, by the reduced risk of cardiovascular disease as the result of the replacement of animal foods with minimally processed plant foods.

For incidence of all cancers combined, based on 5 cohorts, the vegetarian group had a statistically significant 8%, and borderline significant 6% reduced risk, using the fixed effects and random effects model, respectively (Fig. 5).[13 14 29 30] Excluding the Health Food Shoppers Study removed evidence of heterogeneity and strengthened these findings (RR 0.90 [95% CI, 0.85-0.99] using both the fixed effects and random effects models).

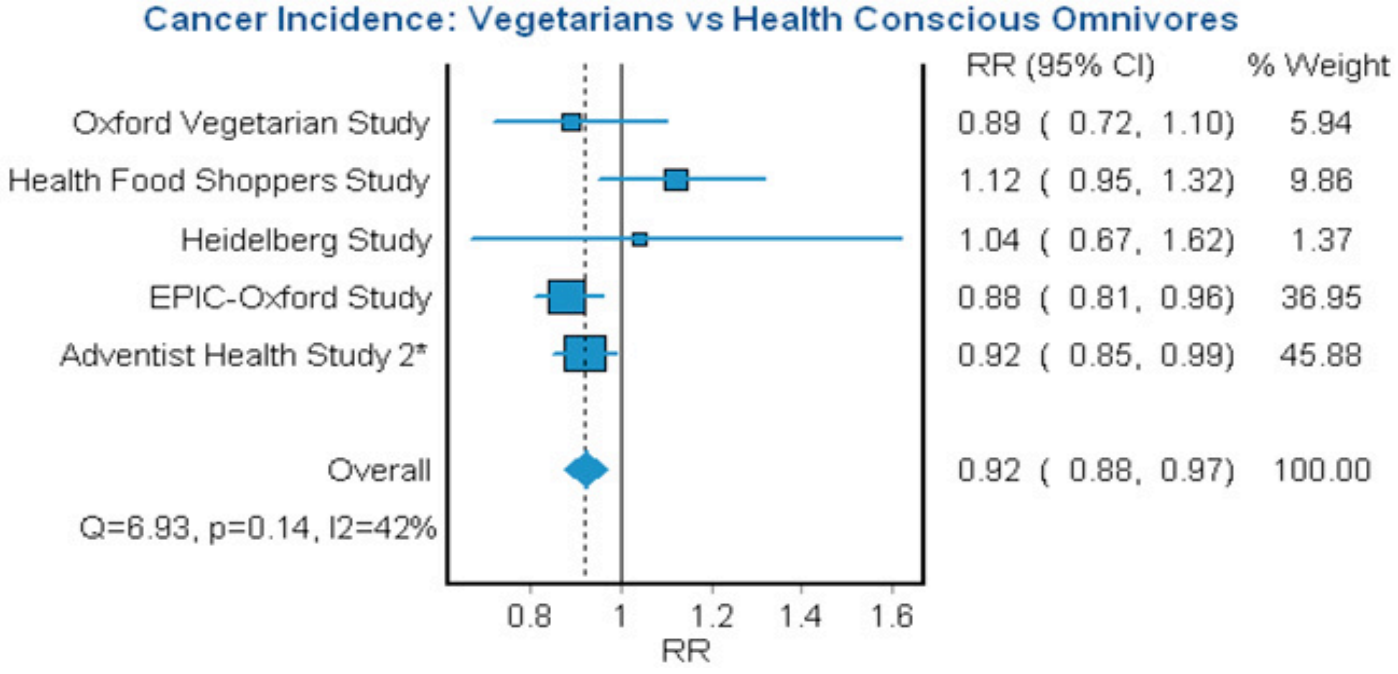


Figure 5. Cancer incidence for vegetarians compared to health conscious non-vegetarians in a meta-analysis using the fixed effects model.
*Indicates that participants classified as semi-vegetarians were included in the vegetation group

The finding of a decreased risk of cancer in vegetarians may also be explained, in part, by a diet devoid in heme iron. Controlled feeding trials have established that NOCs (N-nitroso compounds) arising from heme iron in meat forms potentially cancerous DNA adducts in the human digestive tract, likely in part, explaining the significant association between heme iron and an increased risk of colorectal cancer in recent meta-analyses of prospective cohort studies.[31] [32] [33] Heme iron has also been associated with numerous other cancers. These lines of evidence also provide confidence in the validity of the findings of greater longevity in vegetarians.

Why Some People Choose to Become Health Conscious

In health research, the reasons why some people chose to become health conscious is critically important when interpreting data from observational studies. This is because it is possible that it may not have been the health conscious lifestyle that caused the examined outcome, but rather the outcome that caused the health conscious lifestyle, ie. reverse causality. As previously described in a different review, reverse causality occurs when the studied effect precedes the cause. An example in health research is the frequent paradoxical observation that former smokers have worse health outcomes than current smokers. These unfavorable outcomes are not explained as being caused by smoking cessation, but rather that those who quit smoking tend to have done so because they were showing symptoms of illness, illnesses that ultimately resulted in the observed unfavorable health outcomes. A similar phenomenon has been observed in nutritional research where sick people tend to adopt a more plant-based diet, suggesting that this would bias observational studies towards showing an unfavorable effect of plant-based diets and nutrients, and therefore a favorable effect of animal based diets and nutrients.[34]

Although Denise Minger suggests that the favorable health outcomes for vegetarians observed in many studies maybe unrelated to dietary factors, but rather explained by other healthy habits associated with vegetarianism, she fails to consider the possibility that these vegetarians may have become health conscious, including adopting a vegetarian diet, in order to improve poor health. The results of a recent study from the Netherlands illustrates the critical importance of considering reverse causality in research on plant-based diets. The researchers found that 75% of the vegetarian participants with cancer adopted a vegetarian diet after diagnosis, consistent with previous research which found that cancer survivors are highly motivated to adopt a more plant-based diet with the intention of improving poor health.[35] [36]

Although health researchers often attempt to partially control for reverse causality by excluding participants who were diagnosed with cancer, cardiovascular disease and other life threatening conditions prior to baseline of a study, it is nearly impossible to fully control for reverse causality, as participants may make dietary changes due to symptoms or unfavorable risk factors that act as markers of an undiagnosed or developing disease. For example, it is known that in studies carried out as far back as the late 1950s, participants with unfavorable blood cholesterol levels tended to reduce the intake of dietary cholesterol and saturated fat (ie. in part, by abstaining from animal foods). This resulted in paradoxical findings where participants who consumed more dietary cholesterol and saturated fat actually had lower serum cholesterol levels. These paradoxical findings were produced, in part, because those participants who continued to consume a diet rich in these lipids were choosing to do so because they were able to maintain lower cholesterol levels despite consuming such a diet (ie. due to favorable genetics).[37] Many individuals who attempt to

downplay the harmful effects of these lipids, such as Minger has done in her book have chosen to ignore this critical factor when reviewing research on the diet-heart hypothesis.24

In the chapter Herbivore's Dilemma, Minger reviews several prospective cohort studies that compared the mortality rates of vegetarians to health conscious non-vegetarians, carefully selecting only those studies in which vegetarians were not found to live longer. These studies were the Oxford Vegetarian Study, the Health Food Shoppers Study and the Heidelberg Study, all included in my meta-analysis. Minger emphasizes the lack of reduced risk of mortality in the vegetarian groups, while neglecting to mention that the difference in intake of meat between the groups was relatively small. Minger especially focuses on the Heidelberg Study, happening to be the smallest study, which found a non-significant increased risk of all-cause mortality in the vegetarian group. Minger points out that in this particular cohort, the vegetarians had greater levels of physical activity, consumed less alcohol and smoked less. Minger then states "Mortality and disease rates, in this case, might be expected to turn up in favor of the vegetarian crowd, even though the opposite ended up happening"[p.270]. This statement is outright misleading as all these factors were controlled for in the analysis. One could also correctly point out that the vegetarians tended to be older than the meat eaters, but suggesting that this would be expected to turn up in favor of the meat eaters would also be misleading, as age was also controlled for. Either way, the differences in mortality between the groups did not even come close to being statistically significant.

There are several important findings that Minger neglected to mention that cast doubt on the suggestion that a vegetarian diet had a harmful effect on the participants in the Heidelberg Study. For example, it was shown in an earlier follow-up of this study that, similar to the Adventist studies, the participants who adhered to a very low meat diet for at least 20 years had a 29% lower risk of all-cause mortality compared to those who adhered to such a diet for fewer years.10 Excluding the first 5 years of follow-up significantly strengthened this association, resulting in a 45% lower risk of all-cause mortality, suggesting that reverse causation may have attenuated the results for the entire follow-up.38 This difference in mortality was considerably stronger than the mortality difference between vegetarians and non-vegetarians. Unfortunately the researchers appear to not have provided any data comparing mortality in long-term vegetarians and non-vegetarians. Indeed, in other cohorts it has been observed that compared to non-vegetarians, short-term vegetarians had a higher rate, whereas long-term vegetarians had a lower rate of all-cause mortality.34 These findings suggest that those who adopted a vegetarian diet more recently had done so due to deteriorating health, biasing the results in favor of the non-vegetarians.

Also as already briefly mentioned, in this study it was also found that intake of meat 3 or more time per week was associated with an almost 5-fold increased risk of mortality from ischemic heart disease, whereas there was a greater than 2-fold risk increase for those who consumed fish more than once per month. One of the reasons that this did not translate into an increased risk of all-cause mortality in the non-vegetarian group may have been due to the very low intake of meat, with less than 7% of the non-vegetarians consuming meat 3 or more times a week.14 Another important finding was that there was a trend towards a favorable effect of a vegetarian diet on mortality in the early years of follow-up, which declined over time (Fig. 6).14 This suggests the likelihood of undocumented changes in vegetarian status in a portion of the participants throughout the follow-up, which would be expected to have attenuated a possible favorable effect of a vegetarian diet. A similar phenomenon was also observed in several other studies included in my meta-analysis.9

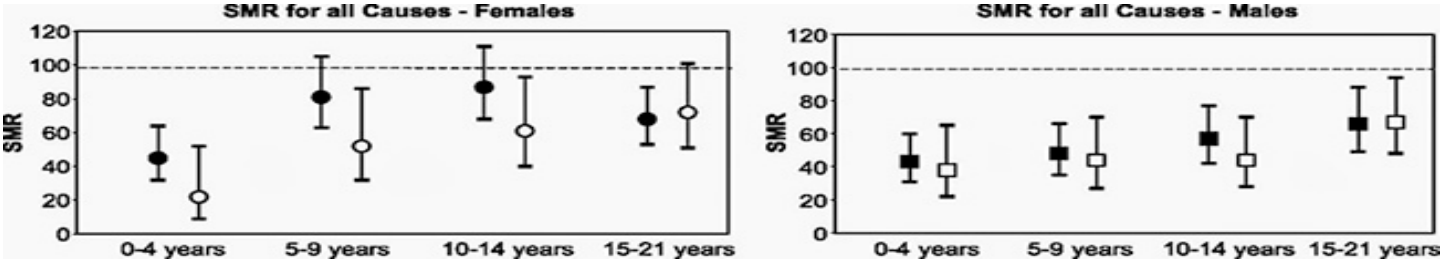


Figure 6. Standard Mortality Rates (SMRs) and their 95% CIs for all-cause mortality, dietary group, and 5-year follow-up period, separately for males and females. (▫, female vegetarians; •, female nonvegetarians; □, male vegetarians; ▪, male nonvegetarians).

Minger also points out that there was a trend towards a higher rate of mortality among the vegans in the Heidelberg Study, which included only 60 vegans, while neglecting to mention that in the Adventist Health Study 2, which included almost 100 times many vegans found that compared to the non-vegetarians, the vegans, especially male vegans experienced a lower rate of mortality.16 In the Heidelberg Study, while current smokers had the same mortality rate from cancer as never smokers, past smokers suffered from a 70% greater risk of cancer mortality than current smokers. This strongly suggests that many of the past smokers in this cohort quit smoking because they had deteriorating health.14 This raises the question as to whether the participants in this cohort also had a tendency to adopt a vegetarian diet after becoming ill, possibly explaining the unfavorable mortality rates in the vegetarian group. Perhaps the reason why the vegetarians in this group tended to be older, was not because they were becoming more ethical with old age, but because they were becoming more health conscious, which included adopting a vegetarian diet due to deteriorating health with old age. As these lines of evidence described suggest, the trends towards elevated mortality in the vegetarian groups in the Heidelberg Study may be explained by reverse causation. It is more than possible that it was not the vegetarian diet that caused these unfavorable outcomes, but deteriorating health, which would ultimately resulted in these unfavorable outcomes that caused a portion of the participants to adopt a vegetarian diet.

ignoring the difficult

There is strong evidence that plant-based diets, including those rich in whole-grains and legumes reduces the risk of premature death from chronic and degenerative diseases, which in-turn helps explain the longevity of a number of plant-based populations. Contrary to the findings for plant-based diets, there is a plethora of evidence demonstrating the harms of popular carbohydrate restricted diets. For example, meta-analyses of clinical trials have found that low-carbohydrate diets elevate LDL cholesterol and impair endothelial function.39 Furthermore, a recent meta-analysis of prospective cohort studies with more than 272,000 participants found that low-carbohydrate diets, particularly those rich in animal foods are associated with an increased risk of all-cause mortality.40 Evidence also shows that the hazardous effects of diets rich in animal foods are also applicable to that of organic, grass-fed animal foods. These, and other lines of evidence described throughout this review appear to have been almost entirely ignored by proponents of these diets, perhaps because they find it too difficult to explain.

Although there is strong evidence that plant-based diets promote longevity, it is important to replace animal foods with minimally refined plant foods in order to achieve the maximum benefits. This may in part explain why the benefits of a vegetarian diet were more evident in the Adventists than other populations.9 In conclusion, the totality of evidence supports the hypothesis that appropriately planned whole foods, plant-based diets promote longevity.

Featured Recipes

We are very fortunate this month to have recipe contributions from two great plant based chefs - Emma Roche of PlantPlate and Margarita Restrepo, Founder and Editor-in-Chief of Naked Food Magazine.

PlantPlate was launched in 2013 by Emma Roche, a decade long plant-based eater and graduate of the T. Colin Campbell Foundation Certificate in Plant Based Nutrition. Combining her love of cooking and passion for healthful eating, Emma uses PlantPlate to provide recipes, guides and resources to help people at any stage of their plant-based journey.

For more recipes and information, visit www.plantplate.com, follow PlantPlate on Facebook at, or on Twitter @plantplate.

3 Bean Mole

Preparation Time: 15 Minutes
Cooking Time: 30 Minutes
Serves: 4 (with accompaniments)

While it may not be a traditional mole, this dish definitely delivers on flavor- richly spiced and slightly smoky, with hints of chocolate and cinnamon. You can serve it a number of different ways- as a main dish with brown rice and salad, as a filling for tortillas, or even as a sauce for pasta.

Feel free to use different varieties of beans in this recipe. We've chosen black beans, pinto beans and kidney beans because they are more traditional, but white beans and lentils will also work well.

Ingredients:

For the Mole Sauce:

1 ½ cups vegetable broth
2 tbsp. tomato paste
2 tsp. ground coriander seed
1 tsp. chili powder
1 ½ tsp. ground cumin
1 ½ tsp. smoked paprika
¼ tsp. cinnamon
1 ½ tbsp. maple or date syrup
2 tbsp. cocoa powder

For the Rest:
1/2 cup low sodium vegetable broth, extra
1 medium brown onion, diced
2 cloves garlic, peeled and minced
1 medium red pepper, diced

1 cup cooked black beans (or 1 x 15 ounce can, drained and rinsed)
1 cup cooked kidney beans (or 1 x 15 ounce can, drained and rinsed)
1 cup cooked pinto beans (or 1 x 15 ounce can, drained and rinsed)

Instructions:
To prepare the mole sauce, combine all ingredients in a large bowl or jug, and mix to combine. Set aside. Heat the extra 1/2 cup of vegetable broth in a large pot.
Add onion, garlic and red pepper; sauté for 5 minutes until softened. Add the prepared mole sauce. Bring mixture to a boil, then reduce the heat to a low simmer and cook for 7-8 minutes until thickened.
Add all beans, and stir well. Cover with a lid and simmer for 10 minutes before removing from the heat. Serve the mole alongside salad and steamed brown rice, or use as a filling for corn tortilla wraps.

Chickpea and Sweet Potato Satay

Preparation Time: 10 Minutes
Cooking Time: 20 Minutes
Serves: 2 (can easily be doubled to serve 4)

This dish is a great weeknight option, because it's ready in just 30 minutes. It can be served on its own, or on a bed of steamed grains such as brown rice.

Those with peanut allergies can use alternative nut or seed butters in this recipe- sunflower and cashew butters in particular will work well.

Ingredients:
1/2 cup water
1 medium brown onion, sliced
1 clove garlic, peeled and crushed
1 tbsp. grated fresh ginger
1/4 tsp. red pepper flakes
1.5 pounds (approx. 700g) of sweet potatoes, peeled and cut into inch-thick pieces
1 red bell pepper, sliced
3 celery stalks, sliced
1 15 ounce (425g) can of chickpeas, drained and rinsed
2 tbsp. chopped fresh cilantro (coriander)

For the Satay Sauce:
1 ½ tbsp. crunchy peanut butter
1 tbsp. salt-reduced soy sauce
2 tsp. rice vinegar or tamarind paste
2 tbsp. sweet chili sauce
1/4 tsp. ground coriander
4 tbsp. water

Instructions: Combine all ingredients for the satay sauce in a bowl and whisk to combine. Set aside. Heat a large fry-pan or wok, add the 1/2 cup of water, onion, garlic, ginger and red pepper flakes; cook, stirring, for 3-4 minutes. Add the sweet potato and cook for a further 12 minutes, adding more water as necessary to prevent sticking. Add the bell pepper and celery and cook for 3-4 minutes, until slightly softened. Add the chickpeas and satay sauce, and cook at a high heat for about a minute, until the sauce thickens. Remove from the heat and serve immediately, sprinkled with fresh coriander.

Cranberry Spice Granola

Preparation Time: 10 Minutes
Cooking Time: 30 Minutes
Servings: 6

If you pick up a package of granola in the supermarket, it may surprise you to discover just how much processed sugar and oil it contains! That's why we came up with a simple, healthy, oil-free alternative. Dried cranberries add tartness and texture, while the pumpkin seeds give it a lovely nuttiness.

Ingredients:
2 cups rolled oats
2 ½ tbsp. agave or maple syrup
1/4 cup applesauce
1 ½ tsp. ground cinnamon
1 tsp. ground nutmeg
2 tsp. finely grated orange rind
1/4 cup pumpkin seeds (can substitute sunflower seeds)
1/2 cup dried cranberries (can substitute raisins)

Instructions: Preheat oven to 170°C / 340°F. Line one large baking tray with baking paper. Combine all ingredients, except for the dried cranberries, in a large mixing bowl. Stir until well combined and none of the oats are dry. Spread granola mixture out over baking tray in a thin layer. Bake in the oven for 15 minutes; remove, stir with a spatula and return to the oven for a further 15 minutes. Remove from the heat and mix through the dried cranberries. Set aside to cool for 1 hour. (Don't worry if it still seems a little wet when you take it out of the oven- it will crisp up as it cools down.) Transfer to an airtight jar or plastic container, refrigerate, and serve as needed.

Millet and Black Bean Salad

Preparation Time: 10 Minutes
Cooking Time: Need cooked millet
Serves: 2 as a main; 4 as a side dish

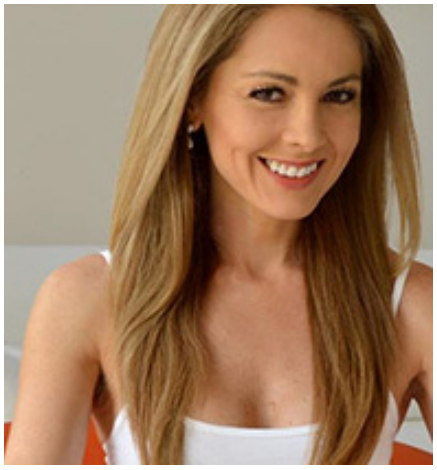
Made with Mexican-inspired flavors and ingredients, this "meal-in-a-bowl" salad is great for lunches, picnics, or days when you need dinner in a pinch.

For this recipe, you will need millet that has been cooked and cooled. It's best to cook a double

batch, use half as a dinner accompaniment, and refrigerate the rest to use in this salad the following day.

Ingredients:
1 ½ cups cooked millet
1 15 ounce (425g) can black beans, drained and rinsed
2/3 cup corn kernels (fresh, canned or thawed frozen kernels)
2 small tomatoes, diced
1 medium carrot, grated
¼ tsp. dried garlic
¼ tsp. cayenne pepper
1 tsp. agave
3 tbsp. lemon juice
2 tbsp. chopped fresh coriander (cilantro)
1 tbsp. chopped jalapenos (optional)

Instructions:
Combine all ingredients in a large bowl and mix until well combined.
Serve immediately, or refrigerate and consume within 24 hours.



Created by Margarita Restrepo, Founder and Editor-in-Chief of the Naked Food Magazine, 'The Naked Food Cookbook' adopts the New American Kind & Enlightened Diet (N.A.K.E.D.). The Cookbook includes 100+ low fat, whole food, plant-based recipes for the prevention and reversal of chronic diseases, as well as for the achievement of optimal health and weight. The cookbook is available at NakedFoodMagazine.com.

Mom's Famous Garbanzos

Yield: 6 Servings. Recipe developed by the Naked Food Chefs

Ingredients:

1 lb. organic chickpeas
1 organic white onion, finely chopped
4 large organic tomatoes, finely chopped
2 cups low-sodium, organic vegetable broth
½ tsp. cumin 2 cloves garlic, chopped
1 tsp. salt-free seasoning 1 cup water as needed

Instructions: Soak chickpeas overnight. Discard the soaking water and rinse beans three or four times under running water.

In a medium saucepan, add tomatoes, onion, cumin, garlic, and ½ cup of

vegetable broth. Let simmer until sauce thickens, in low heat.

Place garbanzos in pressure cooker with the remaining vegetable broth and cook 15 minutes. Carefully open the pot letting the steam out completely first. Make sure liquid covers garbanzos, if not, add 1 cup of water. Add the sauce to chickpeas.

Simmer in pressure cooker covered for about 10 more minutes in low-medium heat.

Rainbow Tower Salad

Yield: 2 Servings. Recipe developed by the Naked Food Chefs.

Ingredients:
1 organic rainbow beet, peeled
1 organic gala apple
1 organic plum
1 organic kiwi
1 Tbsp. coconut flakes
A few berries for topping

Dressing:
1 organic orange, peeled
½ banana
1 Tbsp. hemp seeds
1 Tbsp. cashews
3 Tbsp. non-dairy milk or water (optional)

Instructions: Slice the beet, apple, kiwi, and plum horizontally, starting from the top. You will have a larger slice radius this way. You will be cutting through the apple core and seeds, so simply cut off the small area that contains the seeds and discard. With the plum, slice around the seed as evenly as possible. Put together the towers and top with your favorite berries.

For the dressing:
In a food processor or blender, mix all dressing ingredients together until smooth. Add the non-dairy milk or water if your mix is too thick. Add dressing to the tower and sprinkle with coconut flakes.

Sweetest Quinoa Bites

Recipe developed by the Naked Food Chefs

Ingredients:
½ cup quinoa
2 dates, pitted
3 dried figs
1 Tbsp. hazelnuts
½ banana
2 Tbsp. almond butter
1 cup water

Toppings:
Goji berries,
Chopped Dark chocolate bits
Hemp seeds
Chia seeds

Instructions: Combine water and quinoa in a saucepan. Bring the mixture to a vigorous boil. Lower heat and simmer, covered, until quinoa is tender but still chewy and white spiral-like threads appear around each grain, about 15 minutes. Set aside and let cool down for a few minutes.

Meanwhile, in a food processor chop dates, figs, and hazelnuts and add to a bowl. Mix the banana, quinoa, and almond butter together. Add the quinoa and mix well. Using a spoon or scooper, make 1" balls. Set toppings on parchment paper and roll over quinoa balls.

Chef's Note: These can be refrigerated for a day or two, but are better enjoyed fresh.

World's Best 'Ajiaco' (Potato Soup)

Yield: 8 Servings. Recipe developed by the Naked Food Chefs
Ajiaco (ahee-akoh) is an authentic and hearty potato-based soup from Colombia. This is the nakedly wonderful and even better version of the original.

Ingredients:
3 Lb. organic red potatoes, peeled and sliced
2 organic yellow corn ears
2 scallions
1 Tbsp. organic white onion, chopped
3 garlic cloves, chopped
1 cup organic carrots, finely chopped
4 cups, low sodium, organic vegetable broth
4 cups water 1 sprig cilantro
½ cup dehydrated or fresh Gallant Soldier herbs (guascas)
Capers to taste

Instructions:
In a large pot, place water, vegetable broth, onion, carrot and cilantro to boil. Meanwhile, place gallant soldier herbs in a bowl of warm water for about an hour.

Slice corn ears onto 4 pieces each. Add corn and sliced potatoes. Let soup simmer covered in medium heat for 90 minutes until soup thickens, stirring frequently.

Add gallant soldier and simmer for another 10 minutes in low heat. Top ajiaco with capers, and serve with avocado, salad and rice.

Chef's Note: The soup should be thick. However, add extra water, if too thick. If soup is not thick enough, take a few potatoes form the pot, mash them with a fork and return to the pot.