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Orthomolecular Medicine News Service, October 12, 2011

# What Kind of Medical Study Would Have Grandma Believe that Her Daily Multivitamin is Dangerous?

by Robert G. Smith, PhD

(OMNS, Oct 12, 2011) A newly released study suggests that multivitamin and nutrient supplements can increase the mortality rate in older women [1]. However, there are several concerns about the study's methods and significance.

- The study was observational, in which participants filled out a survey about their eating habits and their use of supplements. It reports only a small increase in overall mortality (1%) from those taking multivitamins. This is a small effect, not much larger than would be expected by chance. Generalizing from such a small effect is not scientific.
- **The study actually reported that taking supplements of B-complex, vitamins C, D, E, and calcium and magnesium were associated with a lower risk of mortality.** But this was not emphasized in the abstract, leading the non-specialist to think that all supplements were associated with mortality. The report did not determine the amounts of vitamin and nutrient supplements taken, nor whether they were artificial or natural. Further, most of the association with mortality came from the use of iron and copper supplements, which are known to be potentially inflammatory and toxic when taken by older people, because they tend to accumulate in the body [2,3,4]. The risk from taking iron supplements should not be generalized to imply that all vitamin and nutrient supplements are harmful.
- The study lacks scientific plausibility for several reasons. It tabulated results from surveys of 38,000 older women, based on their recall of what they ate over an 18-year period. But they were only surveyed 3 times during that period, relying only on their memory of what foods and supplements they took. This factor alone causes the study to be unreliable.
- Some of these women smoked (~15%) or had previously (~35%), some drank alcohol (~45%), some had high blood pressure (~40%), and many of them developed heart disease and/or cancer. Some preexisting medical conditions were taken into account by adjusting the risk factors, but this caused the study to contradict what we already know about efficacy of supplements. For example, the study reports an increase in mortality from taking vitamin D, when adjusted for several health-relevant factors. However, vitamin D has recently been clearly shown to be helpful in preventing heart disease [5] and many types of cancer [6], which are major causes of death. Furthermore, supplement users were twice as likely to be on hormone replacement therapy, which is a more plausible explanation for increased mortality than taking supplements.
- The effect of doctor recommendations was not taken into account. By their own repeated admissions, **medical doctors and hospital nutritionists are more likely to recommend a daily multivitamin, and only a multivitamin, for their sicker patients.** The study did not take this into account. All it did was tabulate deaths and attempt to correct the numbers for some prior health conditions. The numbers reported do not reflect other factors such as developing disease, side effects of pharmaceutical prescriptions, or other

possible causes for the mortality. The study only reports statistical correlations, and gives no plausible cause for a claimed increase in mortality from multivitamin supplements.

- The effect of education was not taken into account. When a doctor gives advice about illnesses, well-educated people will often respond by trying to be proactive. Some will take drugs prescribed by the doctor, and some will try to eat a better diet, including supplements of vitamins and nutrients. This is suggested by the study itself: the supplement users in the survey had more education than those who did not take supplements. It seems likely, therefore, the participants who got sick were more likely to have taken supplements. Because those who got sick are also more likely to die, it stands to reason that they would also be more likely to have taken supplements. This effect is purely statistical; it does not represent an increase in risk that taking supplements of vitamins and essential nutrients will cause disease or death. This type of statistical correlation is very common in observational health studies and those who are health-conscious should not be confounded by it.
- The known safety of vitamin and nutrient supplements when taken at appropriate doses was not taken into account. The participants most likely took a simple multivitamin tablet, which contains low doses. Much higher doses are also safe [4,7], implying that the low doses in common multivitamin tablets are very safe. Further, because each individual requires different amounts of vitamins and nutrients, some people must take much higher doses for best health [8].

Summary: In an observational study of older women in good health, it was said that those who died were more likely to have taken multivitamin and nutrient supplements than those who did not. The effect was small, and does not indicate any reason for disease or death. Instead, the study's methods suggest that people who have serious health conditions take vitamin and mineral supplements because they know that supplements can help. Indeed, the study showed a benefit from taking B-complex, C, D, and E vitamins, and calcium and magnesium. Therefore, if those wanting better health would take appropriate doses of supplements regularly, they would likely continue to achieve better health and longer life.

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