TRIALS OF VITAMIN SUPPLEMENTS FOR THE PREVENTION OF CHRONIC DISEASE

Comment by Pamela Mason

Vitamins are essential for our health and wellbeing. A significant number of British people have diets lacking in these essential nutrients. Vitamins and minerals should ideally be obtained from the diet, but failing that a supplement can help to fill the nutritional gap. To expect a vitamin pill to prevent a multi-factorial disease which has taken a lifetime to develop, may be unrealistic, particularly if the person already has the disease in question. But what can be expected is that a multivitamin containing a wide variety of vitamins and minerals in the recommended daily amount will ensure that the person's intake does not fall below recommended levels.

During recent years, there have been a number of research studies evaluating the effects of vitamin and mineral supplements in the prevention of chronic disease such as cardiovascular disease, cancer, osteoporosis and eye diseases (eg, cataract and age-related macular degeneration).

Results from these studies have been inconsistent. Some studies have concluded that vitamin supplements are associated with reduced risk of chronic disease while others have not.

Cardiovascular disease

The Nurses' Health Study found that the risk of heart disease was reduced by 24% in those who regularly used multivitamins,[1] while in the Stockholm Heart Epidemiology Program (SHEEP), risk of myocardial infarction (MI) was significantly reduced in both men and women who took multivitamins.[2]

Folic acid (with or without vitamin B6 and B12) has been linked with reduced risk of cardiovascular disease by virtue of its ability to lower homocysteine, with recent meta-analyses confirming these findings.[3, 4] In the Cambridge Heart Antioxidant Study (CHAOS), vitamin E reduced the 1-year rate of non-fatal myocardial infarction.[5]

However, two large randomised controlled trials published in 2006 (the Heart Outcomes Prevention Evaluation[7] and the NORVIT [8]Trial) found that supplements of B12, folic acid and B6 in combination reduced plasma homocysteine, but did not reduce the risk of major cardiovascular events in patients with cardiovascular disease[7].

Cancer

In the Health Professionals' Follow-up Study, men who reported folate consumption from multivitamins for less than 10 years had a 25% reduction in colon cancer risk.[9] The Nurses' Health Study found that women who reported multivitamin use (with folate) of 15 years or more had a 75% reduction in colorectal cancer risk.[10]

An intervention trial in China [11] found combined daily doses of beta-carotene, vitamin E and selenium over 5 years were linked with a 13% reduction in cancer deaths and a 9% reduction in all-cause mortality. However, a recent observational study concluded that high use of vitamins and other supplements may increase the risk of advanced fatal prostate cancer.[13] But, the results of this **study are at odds** with a recent case-control study that showed that increased blood levels of selenium in

combination with a daily multivitamin supplement reduced the risk of prostate cancer by 40%.[14]

What is going on?
Clearly no firm conclusions can be reached about the effects of supplements in the prevention of chronic disease such as cardio vascular disease and cancer. Research findings are conflicting and inconclusive.

What is clear, **however, is that vitamins and minerals are essential nutrients which are vital for health.** Furthermore, surveys have shown that the diet of many people in the UK is lacking in these essential substances. **Among women of childbearing age, nine in ten women fail to achieve an adequate intake of either folic acid or iron. Half of adult men and three quarters of adult women fail to achieve the Reference Nutrient Intake for magnesium More worryingly still, one in ten men and one in seven women fail to achieve the Lower Reference Nutrient Intake (LRNI) an intake below which deficiency is likely, of magnesium.[15]**

Studies in adults have shown that **supplement use can make a significant contribution to vitamin and mineral intake.** The National Diet and Nutrition Survey (NDNS) in British adults found that supplement users had higher intakes of vitamins and minerals and were less likely to have intakes below the Reference Nutrient Intake (RNI) than non-supplement users.[15] Similar findings have been shown in Ireland,[16] Germany,[17 18] the US[19] and Canada.[20] In youngsters too, supplements have been shown to make a substantial contribution to the intakes of vitamins and minerals in both toddlers[21 22] and teenagers.[23-26] Several studies[27-29] have also shown that supplementation with vitamin and minerals can improve plasma levels of micronutrients and reduce the prevalence of suboptimal plasma concentrations.

Clearly supplementation can help to bridge the nutritional gap observed in significant numbers of people, as well as maintaining good health.

When it comes to prevention of chronic disease in middle and older age it was never the intention to use vitamin supplements primarily for the prevention of chronic disease. Vitamins are intended primarily for health maintenance. Moreover, it would seem very optimistic to expect a vitamin pill to prevent heart disease or cancer. Vitamins will prevent or cure vitamin deficiency simply because there is one cause of deficiency – i.e. lack of the vitamin or mineral concerned.

The development of chronic conditions like cardiovascular disease and cancer is related to a **whole host of risk factors** (eg, diet, smoking, environmental pollutants, genetics etc). To expect a vitamin pill to work against all these risk factors would seem to be rather unrealistic. With hindsight, therefore, intervention trials evaluating the effect of a vitamin supplement to prevent chronic disease were extremely optimistic.
To put this is context, there is some debate about the **influence of statin drugs to prevent heart attacks, particularly in women.**

Moreover, a careful reading of several of the vitamin trials that have shown either no effect or increased risk of the disease being examined, **shows that the people in the trial often had the disease to start with. For example, in the Heart Outcomes Prevention Evaluation[7] and the NORVIT [8]Trial both of which showed no benefit of B vitamins on major cardiovascular events, the people had already got**

cardiovascular disease and some had even had heart attacks. In other words, these were secondary prevention trials.

In summary, vitamins are essential for health and significant numbers of British people have diets lacking in these essential nutrients. Vitamins and minerals should ideally be obtained from the diet, but failing that a supplement can help to fill the nutritional gap. To expect a vitamin pill to prevent a multi-factorial disease which has taken a lifetime to develop, may be unrealistic, particularly if the person already has the disease in question. But what can be expected is that a multivitamin containing a wide variety of vitamins and minerals in the recommended daily amount will ensure that the person's intake does not fall below recommended levels.

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