



Overweight people need fat-soluble vitamins

People who are overweight and carry extra body fat often receive recommendations to decrease their food intake. Losing weight can be relatively easy; however, losing body fat is a complex process, and one of the complications comes from the fact that decreased food intake means decreased nutrient intake.

To complicate this further, multiple studies have found that people with higher body-fat levels require more fat-soluble vitamins to maintain healthy blood levels of those vitamins.

Question: What are the fat-soluble vitamins?

Answer: Vitamins A, D, E and K are fat-soluble. This means that these vitamins dissolve in oils and fats, unlike the B vitamins and vitamin C, which are water-soluble. Since these four fat-soluble vitamins dissolve in fat, they are absorbed better when they are consumed with fats and oils. Once they are in the body, the fat-soluble vitamins become stored along with fat in fat cells.

Q: How does extra body fat affect the need for fat-soluble vitamins?

A: In general, it appears that someone with more body fat needs more of the fat-soluble vitamins.

For example, low blood levels of vitamin D are more common in obese individuals. This may be because vitamin D gets trapped in the fat cells and is not readily available to meet the body's needs. Consequently, obese individuals appear to require more vitamin D than someone with less body fat. This is likely the case for all of the fat-soluble vitamins, but at this time there is not enough science to know what vitamin amounts are needed by people with high levels of body fat.

Q: What are the roles of these fat-soluble vitamins?

A: These four vitamins have multiple functions in the body. Vitamin A plays an essential role in vision, skin health, bone health and immune function, among other things. Vitamin D is well known for its role in bone health, and a host of other functions have been discovered just during the past decade. Vitamin E carries out important antioxidant functions to protect specific parts of cells from oxidative damage. Vitamin K has long been known to be required for normal blood clotting, but it is now also appreciated for its benefits to bone and arterial health.

Q: What happens if a person does not get enough of these fat-

soluble vitamins?

A: The potential problems are many and complex. They range from vision problems to impaired immune function, bone loss and atherosclerosis.

Q: What are the key food sources of the fat-soluble vitamins?

A: Good sources of vitamin A include liver, fortified milk and fish liver oils. Also, many fruits and vegetables contain the colorful compounds called carotenoids, some of which the body can convert into vitamin A.

The main sources of vitamin D are oily fish such as salmon, mackerel and sardines. Fortified milk is one of the few other good sources.

Vitamin E is mainly found in plant oils, seeds, nuts and products made from plant oils. Even mayonnaise is a good source of vitamin E.

Green leafy vegetables, broccoli, peas and green beans are the major sources of vitamin K. Some vegetable oils also are good sources.

As we learn more about how the need for fat-soluble vitamins is affected by body-fat levels, it could lead to new food and dietary supplement recommendations for helping overweight and obese people maintain health as they attempt to reduce their body fat.

Joannie Dobbs, PhD, CNS and Alan Titchenal, PhD, CNS
are nutritionists in the Department of Human Nutrition, Food and Animal Sciences,
College of Tropical Agriculture and Human Resources, UH-Manoa.
Dr. Dobbs also works with the University Health Service