Enjoy your fruits and vegetables

Eating fruit and vegetables protects against the common chronic diseases of adulthood

When I was young my mother repeatedly admonished me to eat my fruits and vegetables. She had a valid point: the health benefits of fruits and vegetables are remarkably consistent across epidemiological studies. Perhaps the most convincing evidence relates to the risk of cancer. Data from various casecontrol and cohort studies strongly indicate that diets rich in fruits and vegetables reduce the incidence of several common neoplasms, especially of the respiratory and digestive tract. The epidemiological data are in accord with biological mechanisms, as known phytochemicals can alter almost every stage of carcinogenesis. Fewer data exist about cardiovascular disease, but recent observational studies show inverse associations of intake of fruits and vegetables with cardiovascular mortality and the incidence of myocardial infarction and stroke. The results of these observational studies complement evidence from cross-cultural studies, such as the Seven Countries Study, in which mortality from all causes and cardiovascular diseases were lowest in countries with traditional plant based diets.

In this context, the study of Key et al on p 775 adds important information. It is a cohort study of health conscious individuals, whose mortality rates are, as one would expect, much less than those of the general population. The principal findings were 21-32% reductions in mortality from all causes, ischaemic heart disease, and cerebrovascular disease among daily consumers of fresh fruit compared with subjects consuming less fruit. The authors also found inverse associations of similar magnitude between fresh fruit intake and deaths from cancer, although the confidence intervals were wider. An asset of this study is its focus on foods, rather than specific nutrients. Dietary advice based on foods--“eat more fresh fruit”--is easier to understand than advice based on nutrient intake--“increase your intake of flavonoids.” Also, trying to isolate a single active nutrient from the complex interplay of substances contained in foods can be fraught with difficulty. For example, the role of the antioxidant β-carotene is now unclear: recent randomised trials have not shown benefit from supplements, despite evidence from numerous observational studies that consuming foods high in β-carotene is beneficial.

One possible explanation is that β-carotene lacks activity itself but serves as a marker for other protective dietary factors found in these foods.

Key et al point out some limitations of their study, including its inability to detect change of diet over time. In addition, their method of dietary assessment was blunt, and disease specific outcomes based on death certificates may be inaccurate. With such opportunities for misclassification of exposure and outcome, which would tend to obscure associations, it is remarkable that they uncovered the relations they did. Furthermore, as in any observational study, we must be concerned about confounding. For example, fruit eaters are probably more health conscious than non-fruit eaters, even within this cohort. The authors controlled for smoking, but they did not have data on other potentially confounding factors, such as physical activity, body mass index, socioeconomic status, and health beliefs.

The best way to control for confounding is through a randomised controlled trial. As with many lifestyle changes, however, conducting a large, long term trial of the health benefits of fruits and vegetables would be difficult. Observational studies necessarily provide most of the information about health benefits of foods and food groups. The results of Key et al regarding intake of fruits, and to a lesser extent, raw salad and wholemeal bread, are consistent with the large body of evidence from observational studies about the health benefits of plant based diets, especially those high in fruits and vegetables.

The challenge now is to increase the consumption of fruits and vegetables among children and adults in Western societies. Since the industrialisation of agriculture in the past century, residents of Western countries have disproportionately increased meat and dairy consumption. This trend is especially true in the US and UK compared with Mediterranean countries.
data from the US indicate an average intake of fruits and vegetables of three to four servings a day, substantially less than the five to nine servings recommended by the US Department of Agriculture.\textsuperscript{12}

Numerous barriers exist to increasing consumption of fruits and vegetables. The popularity of fast food among some children means that their commonest vegetable is fried potatoes.\textsuperscript{13} Among poorer populations, especially in northern cities, fresh fruits and vegetables are less available and more expensive. In addition, increased demand for fresh produce may mean less regulation of agricultural practices and transportation over greater distances, with an attendant increase in foodborne illnesses.\textsuperscript{14} Fortunately, frozen fruits and vegetables may be as healthful as fresh ones.

These barriers present opportunities for innovative programmes. For example, the US National Cancer Institute sponsors a nationwide initiative to increase consumption of fruits and vegetables to at least five servings per day. This initiative includes promotional efforts in retail stores; a national media programme highlighting an annual “5 a day” week; and education through community channels such as schools, workplaces, and food assistance programmes.\textsuperscript{12}

Clinicians may also help to improve the diets of their patients. Research will clarify what strategies are effective and practical in the clinical setting. For example, techniques based on individual behaviour change, used in smoking cessation programmes, may help,\textsuperscript{15} as may interactive computer based communication systems.\textsuperscript{16} In the meantime, members of primary care teams should take every available opportunity to encourage patients and their families to consume adequate amounts of fruits and vegetables.\textsuperscript{17}

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