

Affordability of fruits and vegetables and dietary quality worldwide



The major preventable risk factor contributing to the burden of disease worldwide is a poor diet, including inadequate fruit and vegetable consumption.^{1,2} In many low-income and middle-income countries, undernutrition—ie, not having enough food—has been a major concern. However, the diet-related burden of disease in these regions is shifting towards non-communicable diseases, such as heart disease, type 2 diabetes, and some cancers. Improving nutrition in all countries now requires both interventions to reduce the intake of harmful foods high in saturated fat, added sugar, and salt, and interventions to increase consumption of healthy foods, such as fruits and vegetables.² WHO recommends a minimum intake of 400 g (ie, five servings) of fruits and vegetables (excluding potatoes and other starchy tubers) per person per day.¹ Interventions to improve diets require a greater understanding of the social, economic, and political determinants of healthy eating.²

In *The Lancet Global Health*, Victoria Miller and colleagues³ estimate the consumption, availability, and affordability of fruits and vegetables in 18 countries across a range of economic levels, and subsequently relate affordability to consumption. Mean per-person intakes were low in all countries studied (3.76 servings [95% CI 3.66–3.86] per day), and ranged from 2.14 servings (1.93–2.36) per day in low-income countries to 5.42 servings (5.13–5.71) per day in high-income countries. Affordability of fruits and vegetables decreased as the economic level of countries decreased; the proportion of household income required to purchase recommended quantities (two servings of fruits and three servings of vegetables) ranged from 1.85% (95% CI –3.90 to 7.59) in high-income countries to 51.97% (46.06–57.88) in low-income countries. Consumption of fruits and vegetables decreased with affordability. Although such findings are not unexpected, this study³ is the first to investigate the relation between fruit and vegetable consumption and affordability worldwide.

As with all multicountry collaborative studies, this ambitious research project faced many methodological challenges. Several limitations of the study are

addressed by the authors.³ Another limitation is that definitions of fruits and vegetables can vary, thus affecting comparability between countries. For example, the definition includes starchy varieties in some countries such as Australia, where at least two servings (150 g) of fruits and five servings (75 g) of vegetables (total 675 g) are recommended per adult per day.⁴ Serving sizes and population perception of these can also vary.

Such challenges might have affected quantitative estimates of fruit and vegetable intakes in this study. The semi-quantitative food frequency questionnaires used a serving size of 125 g.³ Hence, extrapolation produces a mean global intake of 470 g per day, which exceeds WHO recommendations. Most self-reported dietary survey methods are subject to social desirability bias, and consumption of perceived healthy foods tends to be overestimated. Although answers to the questionnaires were validated against 24 h dietary recalls, further validation against objective biomedical indicators of fruit and vegetable intake might be warranted. Nevertheless, this issue should not compromise the internal validity of the findings.

So what could be done to improve the affordability of fruits and vegetables? Governments can regulate food prices using a range of complex policy approaches that target underlying political, economic, sociocultural, and environmental determinants at local, national, and international levels.^{5,6} At a national level, the most common strategies to reduce the price of fruits and vegetables relative to less healthy foods are exemption of healthy foods from a goods and services tax or a value-added tax; subsidies to agriculture and related industries, such as rural and transport subsidies; and subsidies or voucher systems targeted to high-risk groups.⁶

The promotion of fruits and vegetables is often considered the so-called low-hanging fruit of nutrition interventions, because their intake can indicate the nutritional quality of diets. Moreover, promotion of fruits and vegetables is likely to be more palatable economically to governments and the food industry than are interventions that restrict intake of unhealthy choices. But a sole focus on increasing fruit and

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vegetable consumption might not be enough to improve diets. Between 1986 and 2012, remote Aboriginal communities in Australia successfully doubled fruit and vegetable intake when the relative affordability of these foods improved by 30%.⁷ However, the overall effect was a decline in total diet quality, characterised by increased supply and intake of foods high in saturated fat, added sugar, or salt, particularly sugar-sweetened beverages, convenience meals, and takeaway foods, reflecting broader concomitant changes to the Australian food supply.⁷ Australian households now spend around 58% of their food budget on these unhealthy foods; only 10–15% is spent on fruits and vegetables, compared with 29% of the food budget (around 7% of disposable household income) required to achieve recommended intakes.⁸

The International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support (INFORMAS)⁹ is working globally to benchmark and monitor the healthiness of food environments, including diet price and affordability,⁶ using standardised methods. It is not clear from Miller and colleagues' study³ whether the investigators have plans to repeat this cross-sectional survey; but if so, the methods could articulate within the INFORMAS stepwise framework.⁹ Ideally, intracountry variation should also be examined to better target strategies to improve diet and health equity.

Miller and colleagues show that purchasing the recommended amount of fruits and vegetables can be beyond the household budget, particularly in low-income countries. If fresh produce is unavailable

or unaffordable, education alone will not increase consumption. Policy actions to increase affordability of fruits and vegetables will require market intervention and supportive regulations, and are essential to tackle global malnutrition in all its forms.

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I declare no competing interests.

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