

# Rural areas drive the global weight gain

**The global rise in the prevalence of obesity has been seen as an urban problem. A large-scale study challenges this view by showing that weight gain in rural areas is the main factor currently driving the obesity epidemic. [SEE LETTER P.260](#)**

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Urbanization has been linked to increased overweight and obesity levels across populations<sup>1</sup>. However, evidence for this association has been based mainly on calculations of the body mass index (BMI) — the most frequently used tool for measuring overweight and obesity — at the time of study. The dynamics of BMI change in urban and rural areas have not been investigated separately. On page 260, the members of the NCD Risk Factor Collaboration<sup>2</sup> challenge the idea that general BMI trends are mainly a result of urbanization.

The global problem of overweight and obesity has been seen chiefly as an urban issue, partly because access to food services is much greater and easier in cities than in rural areas. City dwellers have an array of options for purchasing highly processed foods and beverages, which are high in salt, saturated fat and sugar, and which are often termed ‘ultra-processed obesogenic foods’. Many low-income communities in urban areas consume predominantly ultra-processed foods and beverages sold at fast-food and small retail outlets, often because they live in so-called ‘food deserts’ — low-income areas where these

are the only available foods. Rural areas, on the other hand, have been seen as a different type of food desert, where people mainly consume produce from their own farms and gardens, and have less access to ultra-processed and packaged food.

Furthermore, the inhabitants of cities have better options for transport, greater access to smartphones and cable television, and more non-physical leisure opportunities than those living in rural areas. They are also more likely to have occupations that are not very physically demanding. All these factors limit energy expenditure. By contrast, rural areas have been seen as places where heavy work on farms, forestry and mining-related activities leads to high levels of energy expenditure. It was thought that the levels of physical activity in rural areas were much higher than those in cities, and hence that the likelihood of weight gain was much smaller in rural than in urban populations.

Research has shown that in some low-income countries, such as China, people living in urban areas have diets that are distinctly different from those of their rural counterparts<sup>3</sup>. In the past two decades, a shift towards obesogenic diets has promoted weight gain and increased the risk of health

problems related to chronic diseases in urban areas in China<sup>3</sup>.

But some research findings have indicated that the levels of overweight and obesity are increasing faster in rural than in urban areas, even in many low- and middle-income countries (LMICs)<sup>4</sup>. This is likely to be linked to the fact that rural areas in LMICs have begun to resemble urban areas, because the modern food supply is now available<sup>5</sup> (Fig. 1) in combination with cheap mechanized devices for farming and transport. Ultra-processed foods are becoming part of the diets of poor people in these countries, and there are reports that infants are even being fed with these foods<sup>6</sup>. Despite these observations, most research and policy efforts have been focused on tackling urbanization as a major driver of obesity, because the general thinking is still that people living in rural areas are much more likely to face hunger and under-nutrition than to be exposed to factors that lead to excessive weight.

All earlier research on BMI trends was based on limited data, and focused on either LMICs or high-income countries<sup>4</sup>. In this context, the paper by the NCD Risk Factor Collaboration is ground-breaking, because it pulls together the latest data from almost all countries to comprehensively examine global BMI trends. The results show that the levels of overweight and obesity are already greater in rural than in urban areas in all high-income countries, and also suggest that the rate of change in many LMICs is such that the levels of overweight and obesity in rural areas will soon match, if not exceed, those in urban areas. Rural hunger, wasting and stunting are rapidly being replaced by overweight and obesity in most regions of the world except sub-Saharan Africa, South Asia and a small number of countries in other areas.

This finding is fundamental, because the



**Figure 1 | Food-supply changes in rural areas contribute to global obesity.** The NCD Risk Factor Collaboration study<sup>2</sup> reveals that increases in body mass index in rural populations in most regions of the world, including low- and middle-income countries, are driving the global rise in obesity. Changes to the food supply in rural areas — from

traditional staples (a) to modern ultra-processed foods (b) — combined with access to motorized transport and mechanized farming equipment in rural areas are contributing factors. a, A street market in Yenumula Palli, Andhra Pradesh, India. b, A village shop in Puttaparthi, Andhra Pradesh.

main focus of geographically targeted obesity-prevention programmes and policies around the globe has been to address urban obesity. Examples of urban-focused interventions include physical-activity policies such as the *ciclovi*as of Latin America that close urban streets to stimulate walking and cycling; the construction of cycle paths in urban areas; the design of urban buildings to enhance movement; and the focus on creating spaces for walking and playing in cities, including creating parks. Initiatives that involve working with retailers and shops that sell food have also mostly taken place in cities. Apart from a small number of policies, such as the provision of government-sponsored shops selling cheap, healthier food in remote rural areas in Mexico, rural populations have been largely ignored.

The study by the NCD Risk Factor Collaboration challenges us to create programmes and policies that are rurally focused to prevent increased weight gain — a major global gap. Several fiscal and regulatory approaches can reach rural areas globally. These range from programmes that combine comprehensive marketing controls, school-food controls and labels on ultra-processed foods, such as those instituted in Chile<sup>7</sup>, to the taxation of unhealthy ultra-processed foods and beverages, as in Mexico<sup>8,9</sup>. These are national programmes that require national legislation and are being implemented in an increasing number of LMICs. However, countries must coordinate multiple regulatory and fiscal programmes similar to those in Chile to truly have an impact on people's behaviour.

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1. Malik, V. S., Willett, W. C. & Hu, F. B. *Nature Rev. Endocrinol.* **9**, 13–27 (2013).
2. NCD Risk Factor Collaboration. *Nature* **569**, 260–264 (2019).
3. Zhai, F. Y. *et al. Obesity Rev.* **15**, 16–26 (2014).
4. Jaacks, L. M., Slining, M. M. & Popkin, B. M. *J. Nutr.* **145**, 352–357 (2015).
5. Popkin, B. M. & Reardon, T. *Obesity Rev.* **19**, 1028–1064 (2018).
6. Huffman, S. L., Piwoz, E. G., Vosti, S. A. & Dewey, K. G. *Matern. Child Nutr.* **10**, 562–574 (2014).
7. Corvalán, C., Reyes, M., Garmendia, M. L. & Uauy, R. *Obesity Rev.* **20**, 367–374 (2019).
8. Colchero, M. A., Popkin, B. M., Rivera, J. A. & Ng, S. W. *Br. Med. J.* **352**, h6704 (2016).
9. Batis, C., Rivera, J. A., Popkin, B. M. & Taillie, L. S. *PLoS Med.* **13**, e1002057 (2016).