Lessons from the Hadza: poor diets wreck efforts to prevent obesity and diabetes

Herman Pontzer

We are all familiar with the unsettling statistics on obesity. The World Health Organization projects that within the next three years, one in three people worldwide will be overweight, and one in 10 will be obese. The global obesity pandemic brings with it a host of health concerns, including an increased incidence of type 2 diabetes. The root cause of weight gain is energy imbalance – taking in more calories than you expend. But the societal causes of obesity, and the reasons behind the sudden increase in unhealthy weight gain worldwide, remain a matter of intense debate: are we eating too much, exercising too little, or both? In this report, Herman Pontzer shines a light on the complexities of energy expenditure and reveals some surprising yet crucial issues.

One way to address the debate is by asking what life was like in the distant past. Many public-health issues in the developed world are thought to arise because our modern lifestyles are so radically different from those in which we evolved. For most of our species' 200,000-year history, we have been living as hunter-gatherers, foraging for wild foods using simple hand-made tools and covering long distances each day on foot.[1] Millennia spent hunting and gathering have shaped our biology; it is the lifestyle to which our bodies are adapted. By comparison, our modern, industrialized lifestyle so very recent that our biology has not had time to adjust.

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Learning from the Hadza

My colleagues and I recently measured daily energy expenditure – calories burned each day – among the Hadza of northern Tanzania, one of the last remaining populations of traditional hunter-gatherers on the planet.[2] While no population living today is a perfect model for our distant past, people like the Hadza allow us to compare modern lifestyles with those more similar to the lifestyle of our hunter-gatherer ancestors. If obesity is on the rise because modern, sedentary lifestyles burn fewer calories, populations like the Hadza should expend more energy each day than populations in the USA or Europe.

To measure daily energy expenditure, we used a technique known as the double-labelled water method. Participants drank a small dose of 'labelled' water, containing uncommon isotopes of hydrogen and oxygen. We then measured the concentration of those isotopes in urine samples taken over the next 11 days. By comparing the concentrations of the uncommon hydrogen and oxygen isotopes in each participant's urine samples, we were able to calculate the rate at which their body produced carbon dioxide. This in turn gave us an accurate, direct measure of energy expenditure for each participant. Double-labelled water is the gold standard for measuring daily energy expenditures because it is much more accurate than other methods, such as activity monitoring or self-reported food intake. It is also safe.

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We lived with the Hadza as they went about their normal daily routines during the study. The Hadza live in grass huts on the dry East African savannah in small camps of about four or five families. Each day, women leave camp in a group to forage for wild plant foods, usually berries, fruits, and tubers. Men head out alone to hunt with a bow and arrows, covering long distances in search of game; they also collect wild honey, chopping into hollow tree limbs with small, simple hatchets. Children too young to forage with their mother, and too old to be carried in a sling, spend the day around camp with the elders. When the men and women return to camp, food is shared widely. The Hadza have no crops, no vehicles or guns, no domesticated animals or machinery; they rely on one another to make a living in a difficult environment.

Unexpected findings

The results were surprising: Hadza energy expenditures were no different from those of modern industrialized populations! We ran a number of statistical tests, accounting for body mass, body fat percentage, age, sex and other variables. In each, energy expenditures among the Hadza were indistinguishable from people living in the USA and Europe. When we compared the Hadza more broadly to a set of 98 populations worldwide, we found their daily energy expenditures were right near the global average.

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Were the Hadza in our study less active than typical hunter-gatherers? Not at all. We measured daily activity using wearable GPS units and found that Hadza men walked an average of 11 km each day, while women walked about 5 km each day. Moreover, all of their food during the study came from the wild, requiring intensive digging to harvest tubers, chopping to access honey, and carrying to get it all back to camp.

We also examined whether Hadza adults were somehow inherently more efficient, and found no evidence for this explanation. In separate tests of the energy cost of walking (calories per kilometre) and resting (calories per minute), we found the Hadza participants in our study were not different from other populations. Foraging requires a complex set of learned skills – hunting, tracking, digging, and chopping, to name a few

– and there is little doubt that the Hadza learn to do carry out specialized tasks more efficiently and effectively than outsiders could, but their bodies do not appear to be inherently more efficient at using energy.

Our results suggest that daily energy expenditure is more complicated than we often envision. We have known for a long time that most of the energy our body burns each day is spent on the basic cellular activity that keeps us alive. Physical activity, even among active people, usually accounts for only a small portion of our daily energy expenditure. The similarity in total daily energy expenditure across peoples of radically different lifestyles suggests that our bodies adapt to their environments, shifting energy expenditure between tasks to keep total expenditures in check. There is some supporting evidence for this hypothesis from other studies of traditional populations but more work is needed to test the idea thoroughly.

It really is about diet

The surprising findings from the Hadza study suggest that decreased energy expenditure is not the primary cause of obesity in modern, industrialized populations – our average daily energy expenditures are probably similar to those of our hunter-gatherer ancestors. Instead, obesity is on the rise because people are eating too much. We are taking in more calories than we need, and the excess is being stored as fat. Unfortunately, overeating is easy to do where food is plentiful and many of our choices are energy-dense, processed foods. Foods that are high in sugars and other carbohydrates may be particularly dangerous, as they depress energy expenditure and leave us feeling hungry.[3]

Exercise is still extremely important! We need to stay physically active to keep our heart, lungs, brain and immune system healthy, especially as we get older. The Hadza offer an important lesson here too: because they are so active, high-blood pressure and other chronic diseases common in developed countries are unheard of among the Hadza, and men and women are active and vital well into their 60s, 70s and 80s. However, when it comes to fighting the global increase in obesity, we need to start by changing our diets. Without a serious effort to change the way we eat, we will have an extremely hard time turning the rising tide of obesity worldwide.

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Vists www.hadzafund.org to learn more about the Hadza and the projects involving their community.

References

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