Modern hunter-gatherers show value of exercise

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The Hadza people, in north-central Tanzania, are among the last hunter-gatherers on Earth. Credit: Brian Wood

In a remote area of north-central Tanzania, men leave their huts on foot, armed with bows and poison-tipped arrows, to hunt for their next meal.

Dinner could come in the form of a small bird, a towering giraffe or something in between. Meanwhile, women gather tubers, berries and other fruits.

This is everyday life for the Hadza, an indigenous ethnic group living around Lake Eyasi in East Africa and one of the last hunter-gatherer populations on Earth.

The Hadza live a very different kind of lifestyle—and a very active one, engaging in significantly more physical activity than what is recommended by U.S. government standards. They also have extremely low risk of cardiovascular disease.

University of Arizona anthropologist David Raichlen and his collaborators, Brian Wood of Yale University and Herman Pontzer of Hunter College, have spent several years studying the lifestyle of the Hadza, which they say provides a glimpse into how our ancestors lived tens of thousands of years ago, and how that way of life may have impacted human evolution, especially with regard to exercise and health.

"Our overall research program is trying to understand why physical activity and exercise improve health today, and one arm of that research program aims to reconstruct what physical activity patterns were like during the evolution of our physiology," said Raichlen, UA associate professor of anthropology. "The overarching hypothesis is that our bodies evolved within a highly active context, and that explains why physical activity seems to improve physiological health today."

A new paper authored by Raichlen and his collaborators and published in the *American Journal of Human Biology* details how much time the Hadza spend engaged in moderate-to-vigorous physical activity, or MVPA, which is a strong predictor of cardiovascular health.

The U.S. Department of Health and Human Services recommends that people engage in 150 minutes per week of moderate intensity activity—about 30 minutes a day, five times a week—or about 75 minutes per week of vigorous intensity activity, or an equivalent combination of the two. However, few Americans achieve those levels.

The Hadza use bows and poison-tipped arrows to hunt big game. Credit: Photo: Brian Wood

The Hadza, on the other hand, meet those weekly recommendations in a mere two days, engaging in about 75 minutes per day of MVPA, researchers found.

Furthermore, and consistent with the literature identifying aerobic activity as a key element necessary to a healthy lifestyle, researchers' health screenings of Hadza people have shown that the population has extremely low risk for heart disease.

"They have very low levels of hypertension," Raichlen said. "In the U.S., the majority of our population over the age of 60 has hypertension. In the Hadza, it's 20 to 25 percent, and in terms of blood lipid levels, there's virtually no evidence that the Hadza people have any kind of blood lipid levels that would put them at risk for cardiovascular disease."

While physical activity may not be entirely responsible for the low risk levels—diet and other factors may also play a role—exercise does seem to be important, Raichlen said, which is significant because humans' physical activity levels have drastically declined as we have transitioned from hunting and gathering to farming to the Industrial Revolution to where we are today.

"Over the last couple of centuries, we've become more and more sedentary, and the big shift seems to have occurred in the middle of the last century, when people's work lives became more sedentary," Raichlen said.

While other studies on hunter-gatherer populations have relied on observational data, Raichlen and his colleagues gathered quantitative data using chest-strap heart rate monitors and GPS trackers to record how far and how fast the Hadza people travel on a daily basis. Hadza study participants put on the monitors at the beginning of the day and handed them over each night to the researchers, who lived amid the Hadza during the study period.

"This is the first study that's looked at their cardiovascular intensity throughout the day, so it helps us understand a little bit more about what

cardiovascular intensity levels are like in this lifestyle," Raichlen said.

David Raichlen (left) and his colleagues have used accelerometers and heart monitors to get a better understanding of physical activity levels among the Hadza. Credit: Brian Wood

Notably, Raichlen said, Hadza adults' activity levels don't seem to fluctuate much over their lifespan.

"In the U.S., we tend to see big drop-offs in physical activity levels when people age," Raichlen said. "In the Hadza, we don't see that. We see

pretty static physical activity levels with age."

Of the fewer than 1,000 Hadza left, an estimated 300 to 400 of them are full-time hunter-gatherers. They live a nomadic lifestyle, moving around every month or two but staying in the Lake Eyasi region. Although there have been attempts by the Tanzanian government and foreign missionaries to settle the Hadza, with the introduction of agriculture and Christianity, those efforts largely have failed, with the Hadza choosing to maintain their traditional lifestyle.

For anthropologists such as Raichlen, working with the population provides a unique opportunity to learn about a lifestyle that is more similar—although not identical—to that of our ancestors. Study participants take part in the research voluntarily and communicate with researchers mainly in Swahili.

"This gives us a window into what physical activity levels were we like for quite a while during our evolutionary history, and, not surprisingly, it's more than we do now," Raichlen said. "Perhaps surprisingly, it's a whole lot more than we do now.

"Going forward, this helps us model the types of physical activity we want to be looking at when we explore our physiological evolution. When we ask what kinds of physical activity levels would have driven the evolution of our cardiovascular system and the evolution of our neurobiology and our musculoskeletal system, the answer is not likely 30 minutes a day of walking on a treadmill. It's more like 75-plus minutes a day."

More information: David A. Raichlen et al, Physical activity patterns and biomarkers of cardiovascular disease risk in hunter-gatherers, *American Journal of Human Biology* (2016). DOI: 10.1002/ajhb.22919

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