As the toll from coronavirus disease 2019 (COVID-19) mounted in the pandemic’s early months, it soon became apparent that people with diabetes and hypertension, among other factors, were at heightened risk of severe disease. But obesity didn’t attract as much attention, according to nutrition scholar Barry Popkin, PhD, of the University of North Carolina (UNC) at Chapel Hill.

That’s what compelled Popkin and his collaborators to crunch the numbers on obesity and COVID-19 worldwide. Their recent systematic review and meta-analysis, published in Obesity Reviews, includes 75 international studies that examined the association of excess weight across the COVID-19 spectrum—from infection to death.

The effect sizes they found surprised even Popkin, a seasoned obesity researcher and distinguished professor of nutrition at the UNC Gillings School of Global Public Health.

If you contract the novel coronavirus, “You have more than double the likelihood of going into the hospital if you’re obese and 50% more likelihood of dying,” Popkin said in a recent interview with JAMA. “Those 2 statistics really shook me.”

The following is an edited version of that conversation, in which Popkin discussed those alarming associations, the possible biological mechanisms behind them, and concerns about vaccine effectiveness among people with obesity.

JAMA: Why was it important to study the relationship of obesity with COVID-19?

DR POPKIN: From a policy perspective people have been ignoring the issue of obesity. And across the globe we have 2 billion overweight and obese individuals, going on 2.5 billion very soon. Obesity is one of the main problems that we face healthwise. And we knew that obesity would have a large relationship with COVID. But it had been ignored by policy makers and researchers relative to diabetes, hypertension, and some other coronary heart disease measures as a major problem for individuals with COVID.

JAMA: Can you tell us a little bit more about overweight and obesity around the world?

DR POPKIN: Not a single country in the world has less than 20% overweight or obese individuals. Many of the poorest nations are now facing overweight and obesity levels of 30%, 40%, 50%, or more. So this is a problem not only for the countries we think about first, like the US, UK, and Australia, which are leaders in obesity levels among the high-income countries, but also across the globe.

In the US, we have 43% of adults who are obese and another 25% to 30% in the overweight category. We are by far the largest country with large numbers of obese individuals. Even if you move to levels of really serious obesity, BMIs [body mass indexes] of 35 or 40 or even 50, we lead the world in the proportions who are in the most severe categories.

JAMA: Your analysis found heightened COVID-19 risks for people with obesity. Can you tell us about those risks?

DR POPKIN: We looked at all stages, from risk of getting COVID, to the risk of hospitalization, going into an intensive care unit, being put on a ventilator, and, finally, dying. What surprised me the most was that obese adults had an additional 113% higher risk of being hospitalized and a 48% higher risk of dying from the disease than normal-weight or overweight adults.

JAMA: You also found that individuals with obesity were more at risk just for being COVID-19 positive.
[Obesity] had been ignored by policy makers and researchers relative to diabetes, hypertension, and some other coronary heart disease measures as a major problem for individuals with COVID.

That obese individuals’ immune systems are impaired. We also know that there’s a lot of metabolic dysfunction that goes on with obesity, and that the adipose tissues become inflamed quite readily. So those 3 things we’ve had some sense of. They’re very much linked to the underlyng COVID-19 risks of diabetes, hypertension, hyperlipidemia, and kidney and liver disease. So those are known pathways.

We know that visceral adiposity has an effect on impairing the lungs, and since the lungs are so impacted by COVID, this has become another major factor. We’ve learned that putting people on their stomachs helps with that.

Your paper suggested that obesity’s physical features can increase COVID-19 risk and severity and may make it harder to care for patients in the hospital.

That’s right. Turning over an obese individual, lifting them up when they’re very sick—that’s a very complex process.

What are the concerns about vaccine effectiveness among individuals with obesity?

My coauthor Melinda [Beck] has published a number of really important studies that then were followed up by other scholars that showed that the flu vaccine really didn’t work as well among the obese. Obviously, there’s benefits from it. In the last couple years in the US some individuals are given 2 [flu] vaccine shots because they need more of the vaccine before it will impact their immune system as much as it does for normal-weight individuals.

So that’s clearly something we’ve known. There was some preliminary work done with some of the SARS [severe acute respiratory syndrome] vaccine candidates which suggested the same kinds of problems. We don’t yet know with the current array of [COVID-19] vaccines how they’ll impact the obese. What we’re strongly recommending is that we start to consider going back and looking at the trial results once they’re published to see how they impact obese individuals and if we need to do additional things with the vaccine to benefit them.

Did you find increased risks for people who are overweight but not obese?

Unfortunately, that’s a huge [knowledge] gap. None of the papers that we have talked about, except 1, reported the same kinds of data for overweight individuals. And this is across the globe. That’s particularly concerning to those of us who work with ethnic subpopulations across the globe. There’s a higher risk for diabetes for Hispanics or hypertension for African Americans at much lower BMIs.

And we know that the weight effects for them appear to be more severe at earlier stages of overweight and obesity.

And the same goes across the globe. Indians, Chinese.... We’ve got studies across Latin America, studies in Africa, studies in the Middle East, that show that these populations become at risk for various comorbidities earlier in the BMI levels. So BMIs sometimes, even of 22, 23, you’ll find a large increase in the risk of diabetes for our Hispanic population in the US. And the same would go for South Asians from India, Pakistan, Bangladesh. We find that at very low BMIs their risk of diabetes goes up significantly.

Is that a gap in COVID-19 data that needs to be rectified?

Absolutely. It’s a very large gap. And it’s really because the world has focused so much on the measure of obesity that we ignore our knowledge on obesity that we ignore our knowledge on overweight in these important subpopulations. We’ve made it seem that obesity is the critical category [for health risks] because for White Europeans and for White Americans it is.

Did you find increased risk as BMI increased?

Yes. The few studies that looked at obesity levels of 35 or 40, those subpopulations had increased risk. We don’t have enough of those studies. But clearly those with BMIs over 35 and over 40 are at significantly increased risk.

We talked about the medical relationships. But we need to also remember that with this pandemic we’ve affected people’s economics and we’ve kept people in their homes and away from shopping. So their entire diets are changing, as well as their activity patterns. Activity patterns in the US and across the world are down. At the same time the purchase pattern has focused more on shelf-ready, ready-to-eat or ready-to-heat kind of junk food and sugary beverages. All of which we now know are really a major cause not only of weight gain but also of many of the cardiometabolic problems we worry about—diabetes, hypertension, liver and kidney disease, coronary heart disease, and many cancers.

The effects on our economic systems are profound in terms of what they’re doing to people’s diets. As you go to lower-income people, we’re finding a bigger concern. Many of these highly processed junk foods and beverages are cheap relative to healthier food. So COVID has just added to the problem for that subpopulation. We need to find ways during these crises to provide healthier food options for all subpopulations.
sales have increased significantly. We don’t know the full impact of it. We don’t have the weight measures to tell us what it will do to overweight and obesity or weight gains in the US. But everything we know is suggestive of important weight gains during this complex period.

**JAMA:** Are you concerned about sedentary behaviors during the pandemic?

**DR POPKIN:** Yes, I am. Walking to the bus, walking to your car, walking to your office—all of these things are activities that were lost. Most businesses, I suspect, will reduce their office spaces and many more people will be working at home.

**JAMA:** So that means even more sedentary time?

**DR POPKIN:** Among 1 subpopulation. After COVID’s over, we will have many other groups having to go back to their work, and that tends to be much more among low- and middle-income populations. For them, the costs during COVID are enormous, and the stresses on them, physical and psychological. We haven’t really addressed those—figured out how to help the population reduce their stress during this time. And I think that’s adding to a lot of the consumption of the highly processed, ultra-processed junk foods and beverages.

**JAMA:** What do you want physicians to know?

**DR POPKIN:** I want them to know 2 things. If they have patients who are obese or even overweight, they need to caution them to be that much more careful about COVID-19. Wear their masks. Be very careful when they’re out and interacting with people outside their core family. At the same time, physicians don’t do enough to talk to their patients about diet and activity and how they could improve those even with limited incomes. We need to do some of that.

I think physicians need to alert people who have gained weight, even if they’re not obese or overweight. Because it’s all a steep slope. Once you start eating differently, it’s very difficult to change that. Encouragement to eat healthier would certainly be important because it’s going to be diet changes that really address obesity and overweight across the globe. It is not going to be getting everybody to the gym or jogging.

But we also can’t shame individuals with obesity. We have to realize there are a lot of environmental causes that we need our government to remove and regulate. We’re not finding that in our country. We need a government that cares more about the population’s health and acts on it.

**Note:** Source references are available through embedded hyperlinks in the article text online.