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Under pressure

If we aren’t sure what causes hypertension, should we really be medicating it, wonders Peter Judge
Last year, I was diagnosed with high blood pressure, otherwise known as hypertension. “Why me?” I asked. “I exercise regularly, I’m not overweight, I don’t smoke and I don’t drink excessively. I even meditate.”

At first, I doubted the diagnosis. Admittedly, my blood pressure had been up in a routine consultation. But when I monitored it at home over the following week, the measurements differed every time, even from one minute to the next. Besides, the average of these readings wasn’t much above the normal range. Yet my doctor had recommended pills to bring the pressure down. Why act on such shifting figures? How do the pills work? Are they safe? Is high blood pressure really a problem anyway? And, again, why me?

Now I know that hypertension increases the risk of death from covid-19. I am even more motivated to get to the bottom of it. And I am surely not alone. One in four adults have high blood pressure – that is some 16 million people in the UK and around a billion worldwide – and, globally, its prevalence is rising, especially in the developing world. It is linked with stress and occurs more often among certain groups of people, including smokers, heavy drinkers and those who are pregnant, inactive or overweight. But there is so much about this common condition that remains a mystery, even to people diagnosed with it. That wasn’t good enough for me. I wanted answers, so I decided to look into it myself.

The first thing I discovered was that the quest to quantify blood pressure has a colourful history. English physician William Harvey established that the heart pumps blood around the body in 1628, but it would be a century before another Englishman, clergyman Stephen Hales, became the first to successfully measure the pressure of the blood in the circulatory system. He took a simple and direct approach, inserting a brass pipe into a horse’s femoral artery and connecting it to a tall vertical glass tube. The column of blood went up almost 2.5 metres. The horse died, of course.

By the 19th century, the condition we now call hypertension had been described, and doctors were looking for safe ways to measure blood pressure. Some contraptions were rather impractical. One, for example, sealed the whole arm in a tank of water and raised the pressure by lifting a movable reservoir. Then, in 1896, an Italian doctor called Scipione Riva-Rocci created a device we would recognise today. He used a stethoscope to listen to sounds in the artery beneath the cuff. When blood flow stops, there is no sound. When it first comes back, there are distinct “tapping” sounds corresponding to systolic pressure. These die away when the flow is unimpeded, giving the diastolic pressure. We use the same basic principle today, although modern “oscillometric” monitors use electronics to analyse pulse vibrations.

So, your blood pressure reading consists of two numbers, measured in millimetres of mercury (mmHg): the first indicating systolic pressure and the second diastolic. Anything between 90/60 mmHg and 120/80 mmHg is considered healthy. In the UK, the National Institute for Health and Care Excellence (NICE) defines high blood pressure as being more than 135/85 mmHg. In the US, you can be diagnosed with hypertension if your blood pressure is 130/80mmHg or higher.

It all sounds very clear-cut and clinical, but, as I discovered, blood pressure is notoriously variable. For a start, it changes according to the time of day, being generally lower at night and rising to a peak in mid-afternoon. In addition to this circadian rhythm, it tends to dip slightly after a meal. Your physical activity affects it too: high blood pressure helps get more oxygen to your muscles and it isn’t unusual to have a systolic pressure of 160 when exercising.

For this reason, doctors try to get “resting” blood pressure measurements. But that can be problematic too, because having your blood pressure taken can be stressful, which will affect the result. Recognising this “white coat effect”, medical professionals in the UK don’t act on blood pressure measured in the clinic unless it is over 140/90 mmHg. Indeed, patients whose readings appear elevated are increasingly asked to take their own measurements at home. And a recently published study tracking 4 million...
**Everyday ways to lower blood pressure**

Modern drugs are highly effective at reducing hypertension, but there are other things you can do to lower blood pressure.

**STEP UP YOUR EXERCISE**
Researchers tracked 138 first-timers entering the 2016 and 2017 London marathon. After running between about 10 and 20 kilometres a week in training, the women completed the course in an average of 5.4 hours and the men in 4.5 hours. Tests revealed that their arteries were less stiff and their blood pressure had gone down by an average of 4/3 mmHg. The older and slower the competitors, the more benefit they got. If training for a marathon sounds too much hard work, any kind of regular aerobic exercise will do you good.

**PASS ON THE SALT**
Despite some claims to the contrary in recent years, eating too much salt is bad for you. Salt raises blood pressure by making your body retain water. In the UK, average consumption is 8 grams per day; NHS advice is 5 grams, or just over a teaspoon. One way to cut down is by avoiding pre-prepared foods, which often contain concealed salt. Also, eat plenty of fresh fruit and veg which contains blood-pressure-lowering omega-3 oils.

**RELAX. REALLY RELAX**
When we are stressed, we produce more adrenaline, which increases our heart rate and blood pressure. We are also more likely to engage in hypertension-inducing behaviours such as overeating, drinking too much alcohol and smoking. Relaxation reduces stress but is notoriously hard to measure. Meditation, for example, seems to help many people, but not everyone. We should all aim for good sleep habits, though. Sleep seems to allow your body to regulate stress hormones, and if you get less than 6 hours, you may wake up still stressed.

**WATCH WHAT YOU DRINK**
People at risk of hypertension are often warned to avoid caffeine, which results in a spike in blood pressure that can last a few hours. The problem arises if this increase is sustained, which doesn’t happen for everyone. A recent study found that half of regular caffeine drinkers become inured to its hypertensive effect. Alcoholic drinks also increase blood pressure temporarily – consuming about two standard drinks a day doesn’t seem to cause harm but habitual, heavy drinking raises blood pressure long-term. However, research reveals that cutting back can reverse this.

**GO GREEN**
Vegetarians and vegans tend to have lower blood pressure than meat eaters. That may be due to saturated fats in meat and dairy, which are linked to high blood pressure, although we aren’t sure how they cause it. In its dietary approaches to stop hypertension, the US National Heart, Lung, and Blood Institute recommends cutting down on meat and dairy and eating plenty of whole grains, fruit and veg. If vegetarianism is a step too far, try swapping some meat for oily fish, which contains blood-pressure-reducing omega-3 oils.

people for a decade showed that self-assessment is just as effective in terms of long-term health outcomes.

My experience was typical. I was told to record my blood pressure at two different times each day. Each time I had to take two readings, about a minute apart, and then use the second, which is presumed to reflect a more relaxed state. If there was a big difference, I could take further measurements until the numbers were steady. There was certainly a lot of variability. Some mornings, my readings would fluctuate from 150/99 to 136/84, and then back again. Nevertheless, overall they averaged 140/91, some 5 mmHg – “5 points” – above the cut-off for high blood pressure. It was official: I had hypertension.

**Age-old risk factor**
I wanted to know why. I knew that chronic stress is a major cause of high blood pressure. Stress triggers the production of adrenalin, which makes your heart beat faster, pumping more blood through the system to gear you up for “fight or flight”. This response is crucial for survival, but when it fails to switch off, the result is hypertension. This helps explain why people living in low-income households, deprived areas and developing countries are particularly prone to high blood pressure. Inhabiting the most deprived areas of England, for instance, increases the risk by 30 per cent. And although the number of people with hypertension is falling in developed countries, globally it has doubled since 1975 because of rises in developing countries. Long work hours are also linked with stress. And research published in 2019 argues that strategies to cut them would lower the public health burden of hypertension.

Fortunately, my life isn’t particularly stressful, covid-19 notwithstanding. Nor do I drink heavily or smoke – two habits strongly linked with hypertension. Being overweight or inactive also increases blood pressure but, again, that’s not me. And I certainly don’t fall into another high-risk group, pregnant women: gestational hypertension affects around 6 per cent of pregnancies and is particularly common in women who have diabetes and those who are older than 40 or younger than 20.

However, there was a risk factor I hadn’t been aware of. On average, between the ages of 16 and 75, people’s systolic blood pressure goes up by about 20 points, an effect that is particularly marked in Western cultures. I am 58, so it would have been unusual if mine
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With nasty side effects, including early death.

Things began to change in the 1960s when the US Veterans Health Administration, which runs a chain of hospitals, started to take disease prevention seriously. Its first major blood pressure study, published in 1967, showed that severe hypertension is treatable. This followed 143 patients with diastolic readings of between 115 and 129. Compared with those who got placebos, the patients given the most promising drugs available at the time had fewer strokes and less congestive heart failure. And the drugs lowered their blood pressure by an average of 43/30.

Other studies followed, showing that drugs also benefit people with moderately high blood pressure, and older people – although the latest results suggest that some very old people would be better off without them.

Meanwhile, better drugs were being developed. Beta-blockers, first made in the mid-1960s, were an early breakthrough. They regulate heart rate by blocking the effects of adrenaline, and turned out to lower blood pressure as well.

Modern drugs are even more effective and have fewer side effects. I am on a calcium channel blocker called amlodipine, widely used in people of my age. It stops cells in my arteries from taking up calcium, which would stiffen them. People younger than 55 are more likely to get ACE inhibitors. Angiotensin-converting enzyme (ACE) is produced by the body to help constrict blood vessels, and these drugs reduce how much of it there is, helping to relax arteries and veins.

Vast numbers of people take these drugs and they are undoubtedly effective. Department of Health figures indicate that in the UK the average systolic pressure has fallen by 3 mmHg over the past decade. That will be having tangible effects. A review published in The Lancet found that every 10 mmHg reduction in blood pressure results in a reduction of 17 per cent for coronary heart disease, 27 per cent for stroke, and 13 per cent for overall mortality.

This success story is even more remarkable when you consider one last fact. Except in a few unusual illnesses, these drugs aren’t “curing” the underlying cause of hypertension. “We do not have a cure for high blood pressure,” says A’Court. “In 95 per cent of cases we simply try to control the problem. That approach works, fortunately!” It certainly has for me.

Are drugs a good option when you can change your lifestyle?

hadn’t increased somewhat since my youth. But is that really anything to worry about? To find out, I contacted Christine A’Court at the Nuffield Institute of Primary Care Health Sciences at the University of Oxford.

“Multiple trials show that resting blood pressure has a close relationship with cardiovascular outcomes, particularly stroke and hypertensive heart failure,” says A’Court. People with high blood pressure have more chance of damage to their blood vessels, putting them at increased risk of all sorts of cardiovascular diseases from heart attack to chronic kidney disease and dementia.

That left me in no doubt of the dangers, but I was still sceptical about medicating my condition. After all, my journalistic research has revealed that we still don’t really know the mechanisms by which age – and most other risk factors – cause high blood pressure.

Are drugs really a good option when there are plenty of lifestyle changes people can make (see “Everyday ways to lower blood pressure”, left)? In answering this question, I discovered that blood pressure treatment might be the first instance of data-driven medicine.

The earliest systematic records go back to the 1920s when insurance companies, noting the connection between high blood pressure and life expectancy, began taking readings from large numbers of potential clients – and refusing cover to anyone with hypertension. Analysis of statistics like these left no doubt that hypertension is a killer.

However, most doctors considered it a natural response to external factors – referring to it as “essential hypertension” – and thought intervention was dangerous and unnecessary. They had a point. Although treatment had moved beyond bloodletting and leeching, at the time it included drugs such as potassium thiocyanate and barbiturates.