English page

Death by coffee?

What you always wanted to know

A Leiden study suggests that coffee could reduce the risk of veinous thrombosis, but we can only be sure after an experiment. "You have to be quite certain before you can claim that drinking coffee is as healthy as eating an apple."

BY BART BRAUN Is coffee good or bad for you, and how bad or good is it? Seventeenth-century scientists could not agree on the matter: while Leiden physician Sylvius recommended it for its "blood-purifying" qualities, his German contemporary Simon Pauli thought it induced effeminacy and impotence. However, neither of them ever did any experiments to actually substantiate their opinions.

By contrast, King Gustav III of Sweden did an experiment because he was convinced that coffee was toxic, ordering a condemned murderer to drink coffee every day. He even did a control test: another murderer had to drink tea daily.

The tea drinker died first, aged 83. By then, Gustav had been killed in an attack that had nothing to do with the coffee prohibition effective at the time in Sweden. A random sample of one might perhaps need more work by modern standards, but at the very least, the experiment suggests that you could live to a grand old age if you drink coffee. We can still see the proof of this today: a lot of coffee is consumed in old folks' homes. The question is, however, whether you live to old age because you drink coffee or in spite of it.

The media only confuse the issue: coffee is effective against Alzheimer's but bad for your heart. It dehydrates you – or no, it doesn't. It contains carcinogenic substances but might reduce the risks of breast cancer. It's been centuries since Sylvius and science still doesn't know the answer, it would seem. So when Leiden researchers publish work that suggests that coffee considerably reduces the risks of thrombosis, we're not quite sure what it means.

"A veinous thrombosis" is the medical term for a blood clot in the veins, which, depending on the exact location of the clot, could be fatal. Leiden epidemiologists – scientists who study the incidence and transmission of diseases in large groups of people but not necessarily epidemics of contagious diseases – specialised in thrombosis, have, among other things, conducted a survey among five thousand thrombosis sufferers and control group of more than five thousand. This survey took in all sorts of risk factors that might cause blood clots, from hereditary factors to obesity and flying habits.

For the coffee study, published this month in the specialist *Journal of Thrombosis and Haemostasis*, they examined more than 1,800 sufferers and an equally large control group. It emerged that the control group – the people who had not suffered from a thrombosis - contained relatively more coffee drinkers.

Nevertheless, there are a number of potential pitfalls that must be dealt with before we can draw any conclusions. The first is obvious: coffee drinkers and non-coffee drinkers differ. Maybe the coffee drinkers eat, smoke, sleep and exercise more or less than the coffee evaders, and maybe those factors mean they are less likely to develop thrombosis, rather than coffee drinking, or perhaps there is another confounding variable coming into play.

This can be solved: ask as much as possible about those confounding variables and then correct for them using statistics, though it is not a perfect solution. For one thing, you don't know what you need to allow for.

PhD student Rachel Roach, the paper's first author, comments: "Of course, you can't allow for everything. But you can allow for many of those unknown factors to be removed from the results because they are related to the things you are allowing for." For instance, if you don't allow for the possibility of eating habits influencing thrombosis, you can offset that partly against factors related to weight and physical exercise. Roach adds: "Moreover, the chances are small that this variable could explain the whole effect." Once the statistic fog had cleared, the Leiden researchers discovered that drinking coffee appears to reduce the risks of thrombosis by thirty per cent. "That's a lot," remarks supervisor Willem Lijfering. "Increased risks are easy to find and they are often much greater risks, but a protective effect of thirty per cent is quite something."

It might be a lot, but at the moment, it is primarily a statistical relation - an important caveat, now that there are more and more studies of this type, not only into thrombosis, but into heart conditions, cancer and other diseases too. If you ask thousands of people to fill in all sorts of things and then ask a computer to find the connections, pure coincidence will produce something. In practice, this technique is called data dredging and is considered misapplication of statistics.

You have to tackle it the other way round: do not wait for a relation to emerge from your data but start with an idea and then see if the data supports your theory. The Leiden researchers have an idea: is a blood clot caused by the presence of all sorts of coagulation factors in the blood, or not? Factor V Leiden – it was discovered in Leiden - is the most famous of those substances, but the epidemiologists think that the Von Willebrand factor and factor VIII are influential factors as the coffee drinkers in their study have lower concentrations of these substances in their blood than the non-coffee drinkers. The researchers suspect that something in coffee reduces the levels of the coagulation factors and consequently protects the drinkers from thrombosis.

But we are not there yet. To make sure this conclusion is reliable, you need an experiment proving that coffee does indeed have this effect, and preferably one that is more thorough than King Gustav III's.

Roach continues: "It is not feasible to ask people to drink, or leave, coffee for years and then see who develops a thrombosis. The incidence of thrombosis is too small for that." If you were to follow a thousand people for twelve months, according to statistics, one of them would develop a thrombosis. So for reliable figures, you would need to follow ten thousand people or more for years, meanwhile hoping that they stick to their coffee habits.

"But we could do a mini experiment," adds the PhD student. "If non-coffee drinkers started to drink coffee, the levels of coagulant factors should drop within a number of weeks and if coffee drinkers stopped drinking the beverage, their levels should rise. Lijfering explains: "According to our calculations, we could get a result from as few as forty test subjects, but we would have to make sure that they do as we ask."