# Exercise can benefit a key heart health factor in postmenopausal women

February 28 2023, by Adrianna MacPherson

Credit: Pixabay/CC0 Public Domain

Exercise has a beneficial effect on the lining of arteries in postmenopausal women, according to a recent review. When the cells lining the arteries are healthy, this could help prevent heart diseases such

as coronary artery disease.

Researchers analyzed data from 35 studies and found that in two-thirds of those studies participants showed improvement in at least one marker of endothelial function, with positive changes in both large and small blood vessels, explains Kyra Pyke, co-author on the study and dean of the Faculty of Kinesiology, Sport, and Recreation.

Endothelial cells line the inside of our blood vessels and regulate vascular function. How well these cells are functioning is a valuable indicator of heart health because they serve as a predictor to the development of atherosclerosis, the buildup of plaque on the artery walls.

"When that function starts to decline, they actually make the artery more prone to the development of atherosclerosis, because healthy endothelial cells are protective against the development of atherosclerotic plaque," says Pyke.

Exercise is already known to help with endothelial function in general, she explains. It increases blood flow to working muscles, including the heart, and the friction of blood moving through the blood vessels stimulates the endothelial cells and increases the activity of a particular enzyme that makes a molecule called nitric oxide.

"Nitric oxide is important to the function of the endothelial cells because it helps support the dilation of blood vessels, which is important for the delivery of oxygen to tissue," says Pyke. Nitric oxide also helps prevent plaque from forming in the arteries, she adds.

## Focus on research about women, for women

Pyke and her co-authors, including first author Lindsay Lew, a Ph.D.

candidate at Queen's University, wanted to summarize knowledge and identify gaps in understanding about how exercise affects postmenopausal women specifically. Many other studies are done only with male participants or don't distinguish between male and female participants. Since sex hormones can affect endothelial function, it's important to consider the effects on men and women separately, says Pyke.

Estrogen, for example, is known to increase the formation of nitric oxide. Pyke's lab previously studied the effect that changes in estrogen over the course of a menstrual cycle had on premenopausal women, and wanted to delve further into what happens with the more chronic decline in estrogen that comes with menopause.

A good way to assess endothelial function is what's called a flow mediated dilation test, where a blood pressure cuff is placed on the forearm and inflated for about five minutes, until the blood vessels downstream of the cuff dilate. When the cuff is released, the blood rapidly rushes back into the forearm through the brachial artery, a larger artery in the upper arm.

"With that big increase in blood flow, you're getting all this friction on the endothelial cells that result in them releasing vasodilators, including nitric oxide. That means nitric oxide will go into the smooth muscle that surrounds the artery and make it relax, and then the artery gets bigger," says Pyke.

In many of the studies the researchers reviewed, a flow mediated dilation test was done before and after an exercise intervention. The bigger the artery diameter gets during the test, the better the endothelial function.

## Positive side-effects of exercise

Pyke stresses that more research is still needed in this area, because the studies her team looked at vary widely in the type, intensity and frequency of the exercise being done. And though the majority of studies saw a beneficial effect of exercise on endothelial function in postmenopausal participants, a third of studies did not. This suggests personal characteristics that may influence the endothelial response to exercise also need to be considered, such as whether women are receiving hormone therapy or how long they have been in menopause.

But even though exercise wasn't 100 percent effective in boosting endothelial function among postmenopausal women, Pyke points out that it has a host of other potential benefits that make it worth pursuing.

Additionally, while most other heart health interventions would never be implemented before an actual diagnosis, lifestyle interventions like exercise are preventative and can be incorporated at any point.

"Compared to drugs, which may have negative side-effects, many of the side-effects of exercise are positive," says Pyke.

"When you're exercising to improve your heart health, you're also going to improve your bone health, it has antidepressant effects—a whole myriad of positive impacts."

The findings are published in the journal *Experimental Physiology*.

**More information:** Lindsay A. Lew et al, The impact of exercise training on endothelial function in postmenopausal women: a systematic review, *Experimental Physiology* (2022). DOI: 10.1113/EP090702

Provided by University of Alberta