

# High-intensity interval training more beneficial for older women than moderate exercise or resistance training alone

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The study involved 92 socioeconomically vulnerable elderly women living in Bauru. Credit: Emmanuel Ciolac/UNESP

A study involving 92 socioeconomically vulnerable elderly women has

compared the efficacy of different low-cost community-based exercise programs to improve and/or maintain cardiovascular and functional parameters, such as waist circumference, blood pressure, and above all, arterial stiffness, a risk factor for atherosclerosis.

An article describing the results is [published](#) in the *European Journal of Preventive Cardiology*. The main conclusion is that [high-intensity interval training](#) (HIIT) combined with [resistance training](#) (RT) to build [muscle strength](#) was the most beneficial option for the women's health.

In HIIT, short periods of intense or explosive anaerobic exercise alternate with brief recovery periods. It involves whole-body exercises performed in the shortest time possible. It has been used for decades by high-performance athletes and has become a craze in recent years, mainly because sessions are short and no equipment is needed.

The other protocols tested were RT alone, and moderate-intensity aerobic training combined with RT. The study was conducted in Brazil at São Paulo State University's School of Sciences (FC-UNESP) in Bauru.

The volunteers performed the exercise programs twice a week for nine months at four neighborhood community centers run by an NGO. Clinical status, anthropometric measurements and specific health parameters (cardiovascular, functional, mobility etc.) were assessed before the first session (baseline), at the end of the nine-month intervention, and three months after that.

HIIT combined with RT and moderate-intensity aerobic training combined with RT were equally efficacious in terms of reducing [waist circumference](#) (by 3.3 cm on average). This benefit persisted after the end of the training period. However, only HIIT combined with RT effectively lowered [systolic blood pressure](#) (7.9 mmHg) and reduced [arterial stiffness](#) (0.69 m/s), which remained so three months after the

end of the training period.

All three programs were efficacious in terms of improved functional performance (handgrip, flexibility, lower limb strength and mobility), but only HIIT combined with RT at least partially maintained the improvements after the intervention.

"The lack of improvement in cardiovascular parameters for the groups that performed RT alone or moderate-intensity [aerobic training](#) combined with RT suggests that HIIT was responsible for the improvement in blood pressure and arterial stiffness. The superiority of HIIT may have been due, at least to some extent, to the need for constant adjustment of blood vessels during interval training," Emmanuel Ciolac, a professor at FC-UNESP and last author of the article, told Agência FAPESP.

During HIIT, [heart rate](#) and stroke volume (the volume of blood pumped out of the heart during each systolic contraction) increase, Ciolac explained. The rise is normally proportional to the intensity of the exercise. Arteries and smaller blood vessels expand to receive the augmented blood flow (vasodilation), contracting again while the body recovers and the blood flow decreases.

"Our hypothesis is that the primary mechanism behind the improvement in arterial stiffness is associated with this constant adjustment of blood vessels and the increase or decrease in production of vasodilatory substances during bursts of exercise alternating with recovery," he said.

## Public policy

The researchers believe that the findings of the study showing the benefits of an affordable exercise program will contribute significantly to the well-being of low-income older women, who are a high-risk group

for cardiovascular diseases, and to the formulation of public policy relating to the prevention of those diseases.

"We expected HIIT combined with RT to assure more cardiovascular benefits, since for the last ten years we've conducted similar studies of other high-risk groups [people with obesity and diabetes, for example], and the combination has always proved beneficial to cardiovascular and metabolic parameters. What surprised us was that the improvement in arterial stiffness persisted even three months after the end of the training period. The training can be said to have slowed vascular aging in these women," Ciolac said.

Arterial stiffness tends to increase the risk of cardiovascular disease. "A reduction of 7 mmHg in systolic pressure is very substantial and considerably lowers the risk of having a heart attack or stroke. Arterial stiffness is the main marker of vascular aging and a very important variable in abnormally high systolic pressure," he explained.

Previous studies by his group showed that HIIT has no risks for people with high blood pressure, obesity or diabetes, or indeed for clinical populations in general.

"The protocol requires a prior assessment to confirm the absence of contraindications, such as a high risk of heart attack, for example. Generally speaking, it's very safe," Ciolac stressed.

**More information:** Vanessa Teixeira do Amaral et al, Superior effect of long-term community-based high-intensity interval training on cardiovascular and functional parameters in low-income older women, *European Journal of Preventive Cardiology* (2024). [DOI: 10.1093/eurjpc/zwae200](https://doi.org/10.1093/eurjpc/zwae200)

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