

Effective management of cardio-metabolic risk factors linked to the built environment

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Researchers have used a new metric to show that cardio-metabolic risk factors for men and women are linked to the built environment. Credit: Pixabay/CC0 Public Domain

Cardiovascular disease is still one of the two leading causes of non-

communicable disease burden and death in North America. A growing body of evidence has linked the built environment to cardiovascular disease risk. A tried and tested approach to preventing cardiovascular disease is to target modifiable risk factors, such as physical activity. For instance, effective population-level interventions have immense potential to reduce cardiovascular disease burdens.

Drawing attention to the built environment's influence on cardio-metabolic health is gaining traction, given its well-known positive influence on physical activity.

While many studies have investigated this association, generalizations cannot be applied between different countries due to differences in climate, healthcare systems, and culture. Furthermore, while the metrics employed to establish possible links between cardio-metabolic risk factors and the built environment have proven to be suitable for generating predictions, the information generated cannot be easily incorporated into making changes in urban design policy.

In a new study published in *Preventive Medicine*, a group of researchers led by Associate Professor Mohammad Javad Koohsari from the Japan Advanced Institute of Science and Technology, an adjunct researcher at the Waseda University as well, propose using a new metric, the space syntax walkability index, to address this limitation.

Professor Koichiro Oka from Waseda University, Professor Tomoki Nakaya from Tohoku University, and Associate Professor Gavin R. McCormack from the University of Calgary in Canada were also involved in planning and executing the study.

Elaborating on the team's motivation, Dr. Koohsari says, "There is a growing awareness about the impact of urban design on cardio-[metabolic health](#), but most of this work is based on studies in the US. We wanted to

explore this relationship in the Canadian context, since findings from different geographical contexts may lack generalizability. While Canada is similar to Western developed countries in terms of its burden of cardio-metabolic risk factors, the interventions needed must account for local nuances."

The research team analyzed data collected from 7,171 participants enrolled in the second wave of Alberta's Tomorrow Project (ATP). These participants lived in [urban areas](#), had provided biological samples (serum, blood, and urine) for cardio-metabolic analyses, and had completed the follow-up health and lifestyle survey. Geographic information systems were then used to calculate two metrics, the traditional walkability index and the space syntax walkability index.

The research group's new urban design metric incorporates space syntax theory. By quantifying the degree of connectivity between streets, the space syntax walkability index represents street integration and describes how well connected a particular street is to others in the area. A highly integrated network requires fewer changes in direction to reach one's destination.

"We found that the novel space syntax walkability metric was negatively correlated to systolic and diastolic blood pressure in men. This metric was also associated with less obesity among men and women. This shows that walkability in urban areas is linked to cardio-metabolic risk factors," stresses Dr. Koohsari when expanding on the study's conclusions.

So how can urban designers and planners improve our cities and design better interventions using this data?

Population-wide changes in cardio-metabolic risk factors can be implemented by creating health-supportive built environments, which enable people to easily make daily, healthy choices via long-term

structural features.

Dr. Koohsari explains, "This novel metric is likely to allow urban designers to identify poorly designed neighborhoods and target these environments for interventions specific to improving the cardio-metabolic risk factors. However, further studies are needed to better understand the relationships between neighborhood built environment and cardio-[metabolic risk factors](#)."

Our altered lifestyle patterns and growing urbanization need not necessarily spell doom for our health and well-being. Through scientifically informed decision making and health-friendly planning, we can design built environments that support our fitness goals. This study is a right step in that direction.

More information: Mohammad Javad Koohsari et al, Urban design and cardio-metabolic risk factors, *Preventive Medicine* (2023). [DOI: 10.1016/j.ypmed.2023.107552](#)

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