

The Urban Environment and Cardiovascular Health

Introduction

Cardiovascular disease (CVD) is currently one of the leading causes of death, both in Australia and worldwide. Risk factors for CVD are known to be strongly associated with physical inactivity.

Neighbourhood design can encourage or discourage physical activity. Dense, well-connected neighbourhoods are often seen as conducive to physical activity and are, therefore, often associated with an improvement in CVD risk factors. However, urbanisation often leads to increased air pollution. Therefore, densely populated neighbourhoods that encourage active lifestyles may also have higher levels of traffic and traffic-related air pollution. Studies have shown that this type of pollution can contribute to CVD and associated risk factors.

Previous studies that have focused on urban design and cardiometabolic health fail to consider the role of air pollution and neighbourhood socioeconomic status and how these associations are explained by physical activity and sedentary behaviours (sitting).

Purpose of study

The purpose of this study was to improve the quality of evidence on the association between the built environment and CVD risk factors. The study includes air pollution levels and the socio-economic status of the neighbourhood, two research variables that are often not considered in similar studies, and how the associations are explained by physical activity and sedentary behaviours (sitting).

The study uses spatial data for the measurement of neighbourhood density and walkability, the natural environment, and the average concentration of air pollutants. Census indices were used to determine the socioeconomic status of the neighbourhood, and clinical assessments were used to obtain information on cardiometabolic indicators (obesity, blood pressure, elevated blood glucose, cholesterol).

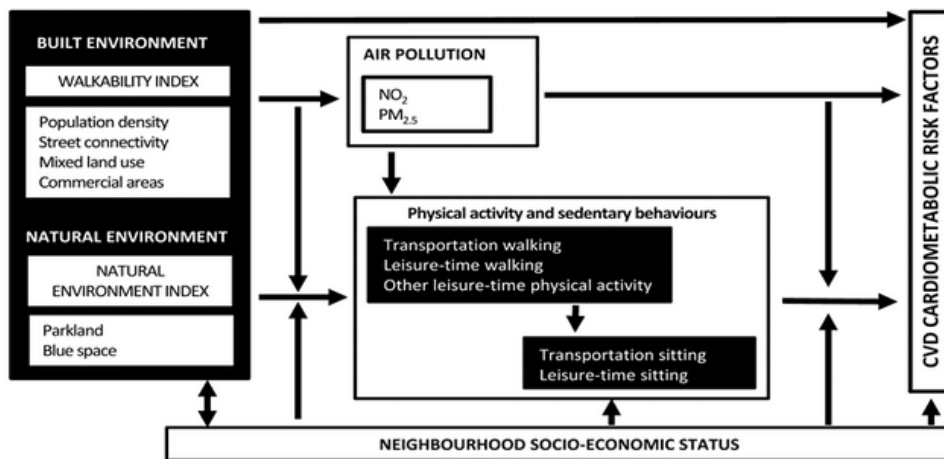


Fig 1. Neighbourhood environment features that may impact cardiometabolic health.

Main Findings

- Walkable neighbourhoods indirectly acted to improve cardiometabolic health by increasing physical activities (walking and resistance training) and decreasing time spent sitting. However, these neighbourhoods also had indirect negative impacts on cardiometabolic health by reducing activities such as gardening and by directly increasing blood pressure.
- The natural environment within the neighbourhood impacted cardiometabolic health indicators indirectly via increasing resistance training and decreasing sitting
- Only a few associations between the neighbourhood environment, physical activity, and cardiovascular health were impacted by neighbourhood SES with disadvantaged neighbourhoods showing stronger negative impacts on some CVD risk factors.
- In most cases, the findings were consistent across neighbourhoods with varying levels of advantage or disadvantage. However, in some instances, individuals in less privileged neighbourhoods showed stronger associations, implying they might be more susceptible to negative environmental influences compared to their wealthier counterparts.



Conclusions and Implications

The unique addition of air pollution and socioeconomic measures adds complexity to the study and provides new information on the relationship between the environment and cardiovascular health. By examining the effects of differing levels of neighbourhood advantage on residents' health, this study may also help to reduce health disparities.

- This study supports the idea that neighbourhoods with good walkability, connectivity and compact layouts are beneficial for reducing sedentary behaviours such as dependence on motorised transportation and promoting physical activity, especially among older adults who engage in walking for transportation and leisure.
- This research also supports the idea that densely populated, well-connected neighbourhoods with access to nature can further improve the cardiovascular health of residents by promoting healthier and more physically active lifestyles.
- The fact that neighbourhood socioeconomic status did not significantly alter the associations between behaviours and CVD risk factors suggests that engaging in physical activity and minimising physical inactivity may be more critical to maintaining good cardiovascular health irrespective of one's neighbourhood socioeconomic status.
- However, due to the few instances where residents from disadvantaged neighbourhoods had stronger associations between the environment and CVD risk factors, it would be beneficial to prioritise socially disadvantaged neighbourhoods when implementing public health interventions that aim to enhance cardiovascular health.

About the AusDiab Study

The Australian Diabetes, Obesity and Lifestyle Study (AusDiab), wave 3 (2011-2012) data was used for this study. The AusDiab study had initially recruited adults (25+yrs) with no physical or intellectual disabilities, who had resided for at least 6 months in one of 42 randomly selected urban areas across Australia.

The AusDiab study was approved by the Alfred Hospital Ethics Committee (ref. no. 39/11) and conducted according to the guidelines of the Declaration of Helsinki. All participants provided written consent prior to partaking in the study.

This current study uses AusDiab wave 3 data (2011-2012) and was supported by a program grant (“The environment, active living and cognitive health: building the evidence base”) from the Australian Catholic University and a NHMRC investigator grant.

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The entire study is available at: <https://shorturl.at/zAKPT>