Impact of the Environment on Cardiovascular Disease

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ABSTRACT:

An average of 17.9 million deaths occur yearly due to cardiovascular disease, making it the leading cause of death worldwide. The purpose of this scoping literature review is to determine the impact of healthy food location and access to green spaces on cardiovascular disease. The search terms environment, heart health, cardiovascular disease, and diets were used to search PubMed and Google Scholar to find articles that met the inclusion and exclusion criteria. CVD risks were low in areas where there was high access to healthy food options and walkable areas. Access to physical activity areas positively influenced women by 22% and men by 16%. Green spaces are associated with reducing heart disease such as a 7% decrease in Acute Myocardial Infarction (AMI), a 6% decrease in Heart Failure (HF), and a 10% decrease in cardiovascular mortality. Access to healthy food and green spaces for physical activity can influence CVD rates. Policymakers should advocate for healthier food options and support businesses that promote active lifestyles.

INTRODUCTION:

Cardiovascular disease (CVD) continues to be the main cause of mortality in the world, resulting in an average of 17.9 million deaths per year [1]. The buildup of fatty plaque, also known as atherosclerosis, in the arteries causes CVD. It leads to decreased blood flow and oxygen to the heart or brain and is caused by factors such as high blood pressure and high cholesterol. This disease can engender a variety of poor health problems such as heart attack, stroke, and heart failure. Understanding the impact of an individual's surroundings and build, which is the human-made conditions, the environment has been neglected by many researchers when finding the causes of cardiovascular disease. Due to cardiovascular disease’s commonality in many individuals, it is essential to address the disease and its prevention because of its significant impact on health care and the lifestyle of many. It is important to note the main influences of the disease to recognize its primary causes and risks. Recent studies have shown that the environment has a large impact on the management of cardiovascular health and CVD risks [2].

A built environment and neighborhood can cause some locations and individuals to be more affected by CVD than others. The environment has a large influence on cardiovascular health

through access to healthy foods and the availability of green spaces. Improving the built environment and implementing certain policies related to increasing the accessibility of healthy foods and physical activity facilities can improve cardiovascular health. Having easier access to green spaces can also allow an individual to have greater access to facilities to prevent health issues. It was found that people living in areas with a high density of greenery had 37% fewer chances of being hospitalized for CVD [1]. Residing in areas with a greater availability of green spaces has effects on one's health. In a longitudinal study conducted in Ontario, Canada, greater degrees of greenness were linked to a lower risk of cardiovascular disease [2]. Access to healthy food locations also has an immense impact on an individual's health. Poor diets are a major cause of cardiovascular disease in people [4]. A person's diet can have negative or positive effects on their health. A person's diet has a great influence on cardiovascular diseases such as blood pressure and obesity [3]. Not having access to healthy foods and places to eat can cause an individual to lean towards unhealthy foods, ultimately leading to a high risk for cardiovascular health. Changing the availability and access to foods within an environment would increase the health of a person's diet. The presence of grocery stores, fast food restaurants, and healthy restaurants influences the design and diets of people in the built environment [4]. The density of essential resources in built environments has a large impact on the influence of cardiovascular disease among individuals.

The purpose of this study is to determine how the density of areas with healthy food locations and access to parks and green spaces affect cardiovascular disease. By analyzing the information gathered we can understand which types of environments result in lower or higher rates of cardiovascular disease among its population of individuals. This research allows healthcare professionals to create policies to promote healthier environments and ways of living.

METHODS:

PubMed and Google Scholar were searched using the search terms environment, cardiovascular disease, heart health, and diets to conduct a scoping literature review. Inclusion criteria were articles with participants between the ages of 20 and 80 years, published in English, and written from 2000 to 2023. Exclusion criteria were articles written in languages other than English, written before 2000, and systematic reviews.

RESULTS:

In a study analyzing the built environment relationship to blood pressure changes, individuals living in high-walkable neighborhoods were tied with decreased systolic and diastolic blood pressure, and environments with a high density of fast-food restaurants and low walkability were related to increases in blood pressure [5]. Zheng et al. examined the relationship between access to healthy food to CVD risks and concluded that CVD risks were low in areas where there was a high mass of healthy food options [6]. Areas where the density of fast food places is high tend to make more people lean towards unhealthy diets, increasing their risk of CVD [6].

Unger et al. demonstrated that men and women have different cardiovascular health (CVH) based on environmental factors [7]. They found that having healthy food available and access to physical activity allowed women to have a greater chance of having better CVH than men [7]. They emphasized that the environment where an individual resides has a great effect on their chance of having an ideal CVH [7]. In a given environment where there is greater access to physical activity resources, men's health is positively impacted by 16% while it is 22% for women [7]. Having residential greenness can have a greater impact on the chances of developing heart disease [8]. Living in areas with green spaces is linked to a 7% decrease in acute myocardial infarction (AMI), a 6% decrease in heart failure (HF), and a 10% decrease in cardiovascular mortality among the adult population [8]. The study also alludes to the fact that positive impact is observed only in the cardiovascular health of people without preexisting conditions of HF and AMI [8].

Table 1: Article Summaries

Article	Purpose	Independent Variable	Dependent variable
Built environment and changes in blood pressure in middle aged and older adults	Analyzes the built environment and resident lifestyle choices in relation to blood pressure changes	- Neighborhood walkability - Density of fast food restaurants	- Changes in systolic and diastolic blood pressure
Scientometric Analysis of The Relationship between a Built Environment and Cardiovascular Disease	To understand the relationship between the built environment and cardiovascular disease and the preventative care needed for CVD.	- Accessibility to healthy foods - Accessibility of green spaces	- CVH Cardiovascular risk factors
Association of Neighborhood Characteristics with Cardiovascular Health in the Multi-Ethnic Study of Atherosclerosis (MESA)	To examine the influence of neighborhood environments on cardiovascular disease and the disease's risk factors.	- favorable food stores - Healthy food availability - Walking environment	- CVH score
Residential Greenness and Cardiovascular Disease Incidence,	Examines the relationships between green spaces and AMI, HF, and CVH.	- Levels of residential green spaces	- AMI -HF -CVH

Readmission, and Mortality			

DISCUSSION:

The study conducted by Zheng et al. demonstrates a correlation between access to healthy food options and cardiovascular disease risks [6]. They determined that areas with a large density of healthy food options had low rates of cardiovascular disease whereas areas with a high concentration of fast food restaurants had high rates of cardiovascular disease due to fast food chains promoting unhealthy diets [6]. The analysis by Unger et al. supports the theory that giving access to fitness amenities can have positive effects on the health of both women and men [7]. The data suggests that access to exercise facilities positively impacts women's health by 22% and 16% for men [7]. Furthermore, the results made by Chen et al. indicate that access to green spaces is associated with a reduced likelihood of developing heart diseases [8]. The adult population residing near urban greenery is coupled with a 10% decrease in mortality from cardiovascular disease, a 6% decrease in HF, and a 7% decrease in AMI [8].

Based on the findings, we can conclude that an environment has a significant impact on cardiovascular health. In alignment with my research question, the availability of healthy food resources and green spaces for physical activities within an environment has the potential to influence CVD rates. The results of the study by Dariush Mozaffarian suggest that having a well-balanced, diverse, and heart-healthy diet is important in preventing CVD [4]. However, based on the findings of a similar study by Li et al., without access to and the willingness to consume healthy foods, individuals won't be able to take on a healthy diet and ultimately will have a difficult time preventing CVD [5]. These two studies are similar yet different due to one article highlighting the importance of a healthy diet in preventing heart disease and the other emphasizing the influence of access to nutritious foods has on people's capability to adopt a healthy diet. These results should be taken into account by policymakers at all levels around the world to advocate policies that support healthier food options and look into supporting businesses that promote active lifestyles to help their citizens live healthy and happier lifestyles.

Limitations:

A limitation of this literature review is that we solely focused on gathering and analyzing information from articles with people between the ages of 20 to 80 years old. Due to the lack of data collected on infants and younger people, the effect of the environment on the CVD rates of these individuals could not be determined. As a result, our findings fail to adequately represent the impact of the environment on CVD rates across all ages. However as the majority of CVD is seen in adults over age 40, the results pertain to the most relevant population.

Recommendations:

Further research should be conducted across all age groups from infants to the elderly, to gain a more extensive and cohesive understanding of the influence of the environment on cardiovascular disease rates over the life course. Lawmakers should mandate and facilitate the establishment of recreation centers and healthy food choices within cities influencing citizens to make healthy choices and lead healthier lifestyles. Sidewalks, pedestrian-friendly walking areas, and parks should be more prevalent in the environment to promote physical activity among individuals. Lastly, future studies should consider the effect of the environment on individuals with pre-existing health conditions. People with pre-existing conditions can be affected differently by their built environment and it is important to recognize the difference between people with and without underlying health conditions.

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