

Evaluating The Impact Of Lifestyle Factors And Presence Of Comorbidities On Cardiovascular Health: A Comprehensive Review Of Literature

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Abstract

Introduction: The World Health Organization (WHO) estimates that approximately 17.9 million deaths from cardiovascular disease (CVD) occur each year. Some lifestyle factors, including obese or higher BMI, smoking, living a sedentary lifestyle, drug abuse, unhealthy diet, and sleep deprivation might raise one's susceptibility to cardiovascular disease. The risk, severity, progression, and outcomes of cardiovascular disease (CVD) can all be affected by comorbid illnesses, which can have a considerable effect on cardiovascular health.

Methodology: Electronic database was searched for the material of this article: main findings in the research articles were extracted and they were then placed into themes that were representative of the main lifestyle habits. The incidence of comorbid and population characteristics was extracted to evaluate the burden and relation of the comorbid.

Results: The main themes are “Diet”, “Smoking”, “Physical activity”, “Substance abuse”, “BMI” and “Sleep deprivation”. Inappropriate diet, lack of physical activity and proper sleep along with higher BMI are risk factors. Substance abuse and smoking can add to adversity. Comorbid conditions affect the progression of the disease.

Conclusion: The substantial negative effects of lifestyle choices and coexisting conditions on cardiovascular health highlight the critical relevance of disease prevention and promotion of good health.

Keywords: Cardiovascular Health, Cardiovascular problems, comorbidity, healthy lifestyle

Introduction

The World Health Organization (WHO) estimates that approximately 17.9 million deaths from cardiovascular disease (CVD) occur each year, accounting for 31% of all fatalities globally¹. Numerous lifestyle variables and the presence of comorbidities, which both considerably increase the risk of CVD, are linked to the rising CVD burden. The effect of these factors on cardiovascular health is quantitatively evaluated in this article, which emphasizes the value of taking preventative actions.

The lifestyle choices we make on a daily basis can have a significant impact on the condition of our cardiovascular system, which includes the heart and blood vessels. An increased vulnerability to cardiovascular disease can result from a variety of lifestyle variables, such as obesity or excess weight, smoking, sedentary lifestyle, substance abuse, inappropriate diet and lack of sleep².

A primary disease may coexist with other illnesses or disorders, which are referred to as comorbid conditions. The risk, severity, progression, and outcomes of cardiovascular disease (CVD) can all be affected by comorbid illnesses, which can have a considerable effect on cardiovascular health. Examples of comorbid conditions that are typical in CVD patients include:

Diabetes: Diabetes increases the risk of CVD by harming the nerves and blood arteries that regulate the heartbeat and blood flow. Inflammation, high blood pressure, high cholesterol, and obesity are CVD risk factors that can all be made worse by diabetes.

Chronic kidney disease: CVD risk can be increased by chronic kidney disease, which can lead to high blood pressure, fluid overload, anemia, electrolyte imbalances, and uremic toxins.

Chronic obstructive pulmonary disease: By inducing endothelial dysfunction, hypoxia, systemic inflammation, and oxidative stress, COPD can raise the risk of CVD. The symptoms and quality of life of CVD patients can also be worsened by chronic obstructive pulmonary disease.

Depression: Depression can raise CVD risk through interfering with platelet function, the immunological system, the neuroendocrine system, and the autonomic nervous system. In individuals with CVD, depression can significantly decrease treatment compliance and raise death rates^{3,4}.

Methodology

The research question formulated as “What is the impact of lifestyle factors and the presence of comorbidities on cardiovascular health?” A thorough search of the relevant literature is conducted to find studies on the impact of comorbidities and early lifestyle risk factors on cardiovascular health. We made use of electronic sources like PubMed, Embase, and the Cochrane Library. A complete search is provided using a combination of keywords and Medical Subject Headings (MeSH) terminology. The search technique takes into account every relevant publication that has been published as of the search date. The development of inclusion and exclusion criteria helps identify which studies should be reviewed. Studies that detail the outcomes of cardiac interventions, research on the early identification of cardiac risk factors, studies that characterize cardiac risk factors in detail, and studies that have a clear therapeutic procedure were all included in the study. Exclusion criteria were specified in order to eliminate studies that lacked enough data or did not fit the research goals.

The chosen studies' data on patients were extracted. Patient characteristics, including sample size, demographics, and clinical presentation, as well as identification of cardiac risk factors (using, for example, biomarkers, imaging techniques, and clinical evaluations) were collected from the studies. Study specifics, such as author, publication year, and study design, were also extracted. The presence of comorbid condition and its impact on cardiovascular health will be measured by the data extracted from the previous studies. As we are writing a review paper on the subject so, main findings in the research articles were extracted and they were then placed into themes that were representative of the main lifestyle habits. The main themes are “Diet”, “Smoking”, “Physical activity”, “Substance abuse”, and “Sleep deprivation”.

Results

The research of literature was done using all databases available online. Only those publications were included which were published in indexed journals. After going through abstracts of all of these full length articles were included in the study. Themes were developed to be further specific in review. The main themes are “Diet”, “Smoking”, “Physical activity”, “Substance abuse”, and “Lack of sleep”. These themes are discussed in the discussion section in detail.

For comorbid association, data was extracted from two studies. The findings of the studies included were tabulated. A total of 3.8 million populations were studied in these articles. Top twelve comorbid conditions and their incidence

were extracted from these studies. Except for hearing loss, all comorbid conditions were more prevalent in women than in men.

Table: Prevalence of Comorbidity

Comorbid	Buddeke J. 2019		Wesołowski 2022	
	Male	Female	Male	Female
1 Asthma	10 %	17 %	15.5 %	22.3 %
2 Back/neck problems	20 %	30 %	18.3 %	30 %
3 Cancer	21 %	22 %	29.7 %	24.8 %
4 Chronic Obstructive Pulmonary Disease	16 %	17 %	30.7 %	26 %
5 Dementia	3 %	5 %	9 %	12 %
6 Depression	8 %	13 %	8 %	15.7 %
7 Diabetes	28 %	26 %	33 %	33.3 %
8 Epilepsy	2 %	2 %	3 %	0 %
9 Hearing	6 %	6 %	14 %	11.5 %
10 Low vision	26 %	32 %	40 %	36.3 %
11 Osteoarthritis	3 %	5 %	24.3 %	39.5 %
12 Osteoporosis	3 %	15 %	5 %	20.7 %

These studies indicated that presence of a comorbid results in more severe cardiac condition. The distribution of the comorbid incidence was stratified on gender.

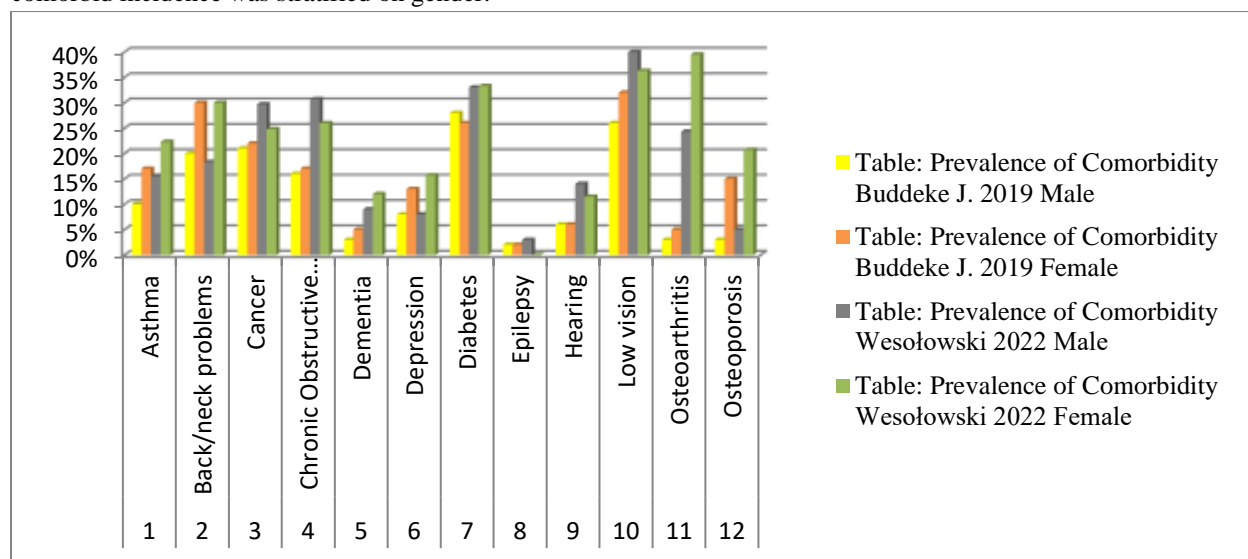


Figure 1: Comorbid Prevalence

Discussion

Diet and Cardiovascular Health: Heart disease and diet are strongly correlated. According to the WHO, unhealthy diets are thought to be a factor in almost 17 million (or 31%) deaths worldwide from heart disease each year¹. Both

could be harmful to cardiovascular health. It can lead to chronic inflammation, high blood pressure, high cholesterol, diabetes, and other risk factors for CVD.

Trans-fat-rich diets, for example, raise the risk of heart disease by 21% and death by 28%⁵. Furthermore, compared to those who consume high intakes, people who consume modest amounts of fruits and vegetables have a twice as high risk of CVD⁶. Another well-known example is the connection between sodium intake and hypertension, a risk factor for cardiovascular disease. In fact, cutting back on salt by just 1 gram a day can reduce the prevalence of hypertension by up to 14%⁷. The correlation between diet and heart disease is robust. The WHO estimates that unhealthy diets contribute to nearly 17 million (or 31%) of deaths from heart diseases each year¹.

Diet can have a negative impact on cardiovascular health. It can result in high blood pressure, high cholesterol, diabetes, and chronic inflammation, all of which are risk factors for cardiovascular disease. Previous research, declarations and recommendations encourage a diet richer in fruits, vegetables, whole grains (especially those high in fiber), nonfat dairy, fish, legumes, and nuts. The recommendations are consistent in advising diets lower in red and processed meats, refined carbohydrates, sugar-sweetened beverages, and saturated and trans-fats. They also urge individuals who drink alcohol (among adults) to do so in moderation. As a method for preserving a healthy weight and, thus, lowering the risk of CVD, all these recommendations have also underlined the significance of striking a balance between calories and exercise⁸.

Over the past 20 years, the emphasis on dietary patterns has replaced the previous emphasis on particular foods and nutrients. To reduce the risk of CVD, experts advise adopting the Dietary Approaches to Stop Hypertension, or DASH (Reduced-fat diets, Mediterranean-style eating and the vegetarian diet). There has recently been a rise in research and writings about "plant-based diets." A concentration of plant foods, such as fruits and vegetables, is what distinguishes these diets. In basic terms, plant-based diets include low-fat diets, the Mediterranean diet, the DASH diet, and vegetarian diets since they place an emphasis on fruits, vegetables, legumes, and nuts while consuming less red meat, processed meat, sugar, and oils⁸.

Smoking and Cardiovascular Health: The health of your heart is seriously threatened by tobacco usage, especially smoking. The risk of developing coronary heart disease increases with daily cigarette consumption, with smokers having a 2-4 times higher risk than non-smokers⁹. In addition, being around secondhand smoke raises heart disease risk by about 30%¹⁰. In particular, quitting smoking significantly lowers CVD risk, practically returning to non-smoker levels in just five years¹¹. Smokers face serious hazards to their hearts and circulatory systems. Atherosclerosis is a disorder that develops as a result of the toxic chemicals in cigarettes damaging the lining of the arteries. Blood pressure increases as a result of this injury, which also narrows the arteries. Additionally, smoking lowers the blood's oxygen content and increases the risk of blood clot formation, both of which can have catastrophic repercussions including heart attacks and strokes¹².

Physical Activity and Cardiovascular Health: The Centers for Disease Control and Prevention (CDC) reports that persons who do not regularly exercise have a 30% higher chance of developing CVD¹³. Physical inactivity is a key risk factor for CVD. On the plus side, reducing this risk can be accomplished by exercising for 150 minutes per week of moderate intensity or 75 minutes of strenuous intensity. Regardless of body weight, regular exercise can actually add two hours to your life expectancy for every hour that it is performed¹⁴. A sedentary lifestyle without routine physical activity can seriously harm cardiovascular health. The likelihood of gaining weight and being obese increases with physical inactivity, which also increases the risk of getting high blood pressure, increased cholesterol, diabetes, and poor blood circulation. The overall risk of cardiovascular disease is raised by each of these elements.

People who don't get engaged in exercise at all have a 150%–240% increased risk of developing coronary heart disease. In accordance with the Physical Activity Guidelines for Americans 2018 and the Centers for Disease Control and Prevention, only about 25% of all Americans meet the minimum requirements, which include engaging in muscle-strengthening activities on at least two days per week and engaging in at least 150 minutes of moderate-intensity aerobic exercise or 75 minutes of vigorous physical activity per week¹⁵. Study demonstrates that persons who engage in even moderate levels of physical activity appear to receive the most benefits in terms of lowering their risk of getting coronary heart disease when compared to people who are the least physically active. These findings imply that for a large section of the American population, even modest improvements in physical activity have the potential to significantly reduce the risk of CHD. Additionally, the 2018 Physical Activity Guidelines Advisory Committee report

highlights how engaging in physical activity considerably lowers the risk of adult weight gain and aids in managing high blood pressure while lowering the chance of getting hypertension in the first place^{16, 17}.

BMI and Cardiovascular Health :The Obesity Society, the ACC, and the AHA all released updated guidelines in 2013 to aid doctors in better-managing obesity.⁴⁰ The five main recommendations included in these guidelines are as follows:

Evaluate obesity-related comorbidities' presence and/or CVD risk. A history, physical examination, clinical and laboratory evaluations, including blood pressure, fasting blood glucose, and fasting lipid panel are all part of the risk assessment for CVD and diabetes in a person who is overweight or falls within the class I to III of obese, according to experts. For people with a BMI of 25 to 34.9 kg/m², a waist measurement is advised in order to assess risk more fully. With a waist circumference that is likely to be raised and providing no extra risk information, it is not necessary to evaluate waist circumference in individuals with a BMI less than 35 kg/m². The Expert Panel advises using the current cut points (>88 cm [>35 in] for women and >102 cm [>40 in] for men) as a sign of higher cardio metabolic risk. When you are developing criteria to assess potential health risks, start with BMI. Inform patients that although small weight loss can be sustained with lifestyle adjustments and can result in important health benefits, larger weight loss results in greater advantages. Weight loss can be accomplished through a variety of nutritional therapy methods. To lower calorie intake, however, the diets had to be prescribed. Patients who are obese or overweight should sign up for comprehensive weight loss programs that last at least six months. Patients with a BMI above 40 kg/m² or a BMI less than 30 kg/m² with obesity-related comorbid conditions should receive advice¹⁸.

Substance Abuse and Cardiovascular Health: When it comes to heart health, drinking alcohol has a double-edged blade. A slightly lower risk of coronary artery disease has been linked to moderate drinking, which is defined as up to one drink for women and up to two for men each day. Any potential advantages should be balanced out against the elevated risk for other forms of CVD, though. For instance, excessive alcohol use can raise blood pressure, which can result in illnesses like hypertension and increase the risk of heart disease by 60%¹⁹.

Using drugs inappropriately or drinking too much alcohol are examples of behaviors that have a negative impact on cardiovascular health. Substance misuse has an impact on a number of cardiovascular functions, including heart rate, blood pressure, blood vessel integrity, and general heart muscle health. Due to these negative impacts, a person is far more likely to experience severe cardiac disorders such as arrhythmias (irregular heartbeats), heart attacks, strokes, and cardiomyopathy (cardiac muscle weakness). In addition to increasing the risk factors for cardiovascular disease, substance addiction can cause chronic inflammation throughout the body. As a substantial lifestyle risk that may have negative effects on cardiovascular health, substance misuse must therefore be acknowledged and addressed^{20, 21}.

Sleep Deprivation Cardiovascular Health: Realizing how important it is to live a healthy lifestyle that includes regular exercise, maintaining a healthy weight, and quitting smoking is essential. By making deliberate decisions to address these lifestyle factors, we can greatly lower the chance of acquiring cardiovascular diseases and support an all-around healthier cardiovascular system. Not enough sleep various hormonal pathways that control important facets of human health can be significantly impacted by inadequate or insufficient sleep. The delicate hormonal balance that regulates hunger, metabolism, blood pressure, and inflammation, in particular, can be upset.

Because the hormones that control hunger may be impacted by this disruption, eating too much and gaining weight may follow. Furthermore, due to how sleep deprivation affects the body's capacity to appropriately control blood sugar levels, irregular sleep patterns have been related to an increased risk of diabetes. Since obesity and diabetes are known risk factors for heart-related problems, these conditions ultimately lead to a greater vulnerability to cardiovascular disease^{22, 23, 24}.

Comorbidities and Cardiovascular Health: Comorbidities, particularly diabetes, hypertension, and obesity, pose substantial threats to cardiovascular health. Diabetes and hypertension increase the risk of heart disease by 2-4 times and 2-3 times, respectively²⁵. Moreover, people with diabetes are two times more likely to have heart disease or a stroke compared to those without diabetes²⁶. Even in younger age groups, comorbid disorders are quite prevalent in CVD patients. According to research from the Netherlands, 85% of patients with heart failure, 83% of patients with peripheral artery disease, 81% of patients with coronary heart disease, and 79% of patients with stroke had at least one comorbid condition. Hypertension, osteoarthritis, anxiety/depression, persistent low back pain, and diabetes were the most prevalent coexisting illnesses not related to the heart⁵.

For CVD prevention and treatment, comorbid disorders provide a difficulty since they call for an all-encompassing, customized strategy that takes into account the interactions and effects of many diseases. It may be necessary for the healthcare system to make organizational changes to account for comorbid conditions in patients with CVD in order to provide efficient and effective care²⁵.

Conclusion

The extensive impact of lifestyle factors and comorbidities on cardiovascular health underscores the vital importance of health promotion and disease prevention. The need of giving health promotion and prevention top priority is underscored by the realization of the extensive effects of lifestyle variables and comorbidities on cardiovascular health. People's risk of getting cardiovascular illnesses can be considerably decreased and their general well-being can be improved by proactively addressing these issues. The term "health promotion" refers to a variety of strategies and programs that provide people with the tools they need to adopt healthy habits and make decisions that will improve their cardiovascular health. It entails promoting cardiovascular wellness through various activities such as increasing knowledge of the value of the consistent physical activity, consuming a nutritious diet, controlling stress levels, and other similar practices. The prevalence of cardiovascular diseases can be significantly decreased in the population by motivating people to make these healthy lifestyle modifications.

Adopting healthier lifestyles, including a balanced diet, regular physical activity, cessation of smoking, and moderation of alcohol intake can significantly mitigate the risk of CVD. Likewise, managing comorbidities such as diabetes, hypertension, and obesity is equally crucial. A multipronged approach that encompasses these facets will be instrumental in improving cardiovascular health globally. In order to reduce the burden of cardiovascular diseases, disease prevention is crucial. In order to take preventive action, risk factors like obesity, smoking, inactivity, high blood pressure, diabetes, and high cholesterol must be identified and managed early on. This entails conducting routine health exams, putting preventive measures into place, and disseminating information on risk factor management.

Healthcare systems and communities can allocate resources to address cardiovascular health efficiently by concentrating on health promotion and illness prevention. This might entail putting public health campaigns into action, opening up options for affordable, wholesome food, encouraging measures to increase physical activity, and supporting programs to help people quit smoking. The importance of lifestyle changes is also emphasized by healthcare professionals, who often give patients individualized advice on implementing good habits.

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