Association between Food Insecurity and Hyperlipidemia, Hypertension, and Diabetes among US Adults

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ABSTRACT:

Background

The risk of cardiovascular disease, a major problem among US adults, may be decreased by following a healthy way of living. However, many adults may face food insecurity, preventing them from maintaining a balanced lifestyle and leaving them vulnerable to the three main risk factors of cardiovascular disease: hyperlipidemia, hypertension, and diabetes. This literature review examines the extent of the association between food insecurity and the risk factors of cardiovascular disease.

Methods

This review identified relevant studies by searching Pubmed and Google Scholar using key terms related to food insecurity and the risk factors of cardiovascular disease. Studies were included if they were original research papers that occurred in the US and involved adults while exclusion criteria included papers not published in English, studies which involved children, and review articles.

Results

Across five studies, increasing food insecurity was associated with at least one major risk factor of cardiovascular disease. Most studies found higher rates of hypertension, hyperlipidemia, and diabetes among adults facing food insecurity; however, some studies reported inconsistent associations, particularly for hyperlipidemia and hypertension. The magnitude of the association varied based on the study's geography, populations, and measurement methods.

Discussion

Although some findings show inconsistencies possibly due to differences in study design and population studies, the majority of the studies indicate that food insecurity is associated with a higher prevalence of hyperlipidemia, hypertension, and diabetes. These results highlight the importance of addressing food insecurity through targeted public health interventions to reduce cardiovascular disease risk and suggest the need for further research that evaluates intervention effectiveness and examines the geographic influences on this association.

INTRODUCTION:

Significance of the Problem

Cardiovascular disease (CVD) is the leading cause of death in the United States, affecting more than 90 million people and accounting for 30% of deaths each year [1]. While the risk of CVD can be avoided by following a healthy lifestyle, most adults burdened with food insecurity, which is the condition where someone does not have access to adequate food, are unable to eat healthy [2]. This is due to nutritious foods being more expensive, less accessible in underprivileged communities, and often requiring cooking resources or extra time that adults facing food insecurity may not have [2]. The prevalence of CVD is six times higher in households that struggle with food insecurity than food secure households [3]. In order to avoid hunger, adults consume energy-dense, nutrient-poor foods with high carbohydrates, added fats, and high sodium, as these foods cost significantly less then healthier alternatives [3]. These dietary habits cause known risk factors of CVD ,including hypertension, hyperlipidemia, and diabetes, which are all affected by one's diet [2,3].

Objectives

This review examines whether food insecurity is associated with CVD risk factors, specifically diabetes, hyperlipidemia, and hypertension. Food insecurity may be a significant cause of CVD risk factors but the extent to which food insecurity affects CVD remains unknown. By better understanding the relationship between the two factors, interventions can be developed and policies may be put into place to reduce the risk of CVD among Americans.

METHODS:

Search Strategy

This review searched PubMed as well as Google Scholar with the key terms "cardiovascular disease," "risk factors," "diabetes," "hypertension," "hyperlipidemia," "high cholesterol," "high blood pressure," and "food insecurity" combined with Boolean operators to identify relevant studies. Studies were included if they involved adult populations, original research articles, and research conducted in the United States. Excluded articles were those not published in English, studies which involved children, review articles, and case studies.

RESULTS:

All five studies reported a positive association between food insecurity and at least one of the risk factors for CVD, including hyperlipidemia, hypertension, and diabetes among US adults [4-8]. A summary of these findings is presented in Table 1.

Hypertension

For hypertension, Brandt et al. found that 53.3% of adults experiencing food insecurity had hypertension [4]. Seligman et al. observed that adults facing food insecurity had a 21% higher chance of clinical hypertension compared to food secure adults [5]. Similarly, Nagata et al. found

that for hypertension, 15.7% adults with food insecurity had self-reported high blood pressure in contrast to 10.5% food secure adults [6]. Mendy et al. also found high rates with 45.8% adults facing food insecurity in Mississippi reporting hypertension [7]. However, Royer et al. found contrasting results with 21.7% adults challenged with food insecurity having hypertension compared to 73.3% food secure adults having high blood pressure [8].

Hyperlipidemia

Regarding hyperlipidemia, Seligman et al. reported higher prevalence in adults with food insecurity both clinically (21.7% vs. 19.8%) and self-reported (43.3% vs. 33.3%) compared to food secure individuals [5]. In contrast, Nagata et al. observed slightly lower self-reported rates of hyperlipidemia among adults with food insecurity, specifically 7.5%, compared to 8.1% food secure adults [6]. Royer et al. had similar results to Nagata et al., finding 21.5% of adults experiencing food insecurity having hyperlipidemia while 73.9% of food secure adults had high cholesterol [8]. Meanwhile Mendy et al. reported that 40.6% of those with insecurity had hyperlipidemia [7].

Diabetes

For diabetes, Brandt et al. found that 17.8% of adults with food insecurity had the condition [4]. Seligman et al. reported a higher prevalence among adults navigating food insecurity as well: 10.6% vs. 7.6% by self-report, and 15.9% vs. 7.0% by clinical results [5]. Nagata et al. also noted a disparity with 5.1% of young adults facing food insecurity self-reporting diabetes compared to 2.2% of food secure individuals [6]. Mendy et al. found that 46.4% of adults with food insecurity had diabetes, specifically in Mississippi [7]. Royer et al. reported differing results, with 27.1% of adults coping with food insecurity having diabetes while 68.0% of food secure adults had the condition [7].

Table 1. Prevalence of CVD Risk Factors among Food Insecure and Food Secure adults across five Studies

Study (Author, Year)	**Hypertension**	**Hyperlipidemia**	**Diabetes**
Brandt et al., 2022	Food Insecure: 53.3% Food Secure: N/A	Food Insecure: N/A Food Secure: N/A	Food Insecure: 17.8% Food Secure: N/A
Seligman et al., 2010	Food Insecure (Clinical): 22.4% Food Secure (Clinical): 18.6% Food Insecure (Self-report): 24.6% Food Secure (Self-report): 20.2%	Food Insecure (Clinical): 21.7% Food Secure (Clinical): 19.8% Food Insecure (Self-report): 43.3% Food Secure (Self-report): 33.3%	Food Insecure (Clinical): 15.9% Food Secure (Clinical): 7.0% Food Insecure (Self-report): 10.6% Food Secure (Self-report): 7.6%

Nagata et al., 2019	Food Insecure: 15.7% Food Secure: 10.5%	Food Insecure: 7.5% Food Secure: 8.1%	Food Insecure: 5.1% Food Secure: 2.2%
Mendy et al., 2018	Food Insecure: 45.8% Food Secure: N/A	Food Insecure: 40.6% Food Secure: N/A	Food Insecure: 46.4% Food Secure: N/A
Royer et al., 2025	Food Insecure: 21.7% Food Secure: 73.3%	Food Insecure: 21.5% Food Secure: 73.9%	Food Insecure: 27.1% Food Secure: 68.0%

DISCUSSION:

The five studies suggest that food insecurity has a meaningful and measurable impact on key CVD risk factors such as hyperlipidemia, hypertension, and diabetes among US adults. Most studies consistently reported higher prevalence rates of these conditions in food insecure populations, with some findings showing increases of 1.9-10.0% or more compared to food secure populations [5,6]. The largest disparities were observed in self-reported hyperlipidemia (+10.0%) and clinically measured diabetes (+8.9%) [6]. However, the extent of this effect varies depending on the population studied, geographic location, and data collection methods.

The reason we see a relation between food insecurity and higher CVD associated morbidity is likely due to an overconsumption of unhealthy food. A study by Celik et al. showed how food insecure college students have an increased consumption of sugar-sweetened beverages, saturated fats, and salt [9]. Over time, this sustained pattern of unhealthy eating contributes to weight gain, hypertension, and hyperlipidemia [9]. Another study by Kern et al. among black and hispanic US adults also mentions how the price of healthier food is nearly twice as high as the price of unhealthy alternatives ($0.590 vs $0.298 per serving) which further leads adults with food insecurity to rely on cheaper, calorie-dense food [10]. This difference between prices reinforces dietary patterns that increase the risk for hypertension, hyperlipidemia, and diabetes.

Some studies in this review reported weaker associations than others, which can be due to factors such as underdiagnosis, self-report bias, or limited healthcare access among food insecure groups. Interestingly, results for hyperlipidemia and hypertension were inconsistent. Some studies such as those by Nagata et al. and Royer et al. have found that food secure adults are more likely to have high cholesterol compared to adults with food insecurity [6,8]. These unexpected findings could have resulted from several factors such as reliance on self-reported data, sampling differences between studies, or the geographic or cultural contexts such as the specific state findings from Mendy et al. [7].

Despite these inconsistencies, the overall pattern supports the conclusion that food insecurity contributes significantly to the burden of CVD risk factors. These results align with current literature, suggesting that food insecurity increases the vulnerability for CVD by encouraging the consumption of inexpensive, nutrient-poor foods, high in sugar and unhealthy fats [2,3]. Over time, these dietary patterns contribute to elevated blood pressure, high cholesterol, and diabetes

which are the main risk factors of CVD. Other social determinants of health such as limited access to healthcare, education, and economic restraints might further exacerbate these risks.

Given these findings, interventions aimed at reducing food insecurity could have significant public health benefits. Policies that specifically increase access to affordable and nutrient-rich foods such as the Supplemental Nutrition Assistance Program (SNAP) could help mitigate CVD risk among adults with food insecurity. Future research in food insecurity and CVD should focus on longitudinal and interventional studies that assess the long-term effects of food insecurity on the risk factors of CVD. This can help further determine how demographic and geographic factors influence the risk of CVD.

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