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CAMPUS DESIGN AND HEALTHY FOOD CHOICES FOR LOW-INCOME AND INTERNATIONAL COLLEGE STUDENTS: LITERATURE REVIEW

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Abstract

Food insecurity and poor eating habits are becoming concerns in college education, particularly for low-income and international students. In this narrative literature review, the effect of campus design on access and consumption of nutritious food is presented, synthesizing evidence from 2000 to 2025. Reviewing was done through a systematic five-phase protocol: identification, screening, eligibility, inclusion, and synthesis. From this process, 58 peer-reviewed articles were chosen for full-text screening, with an emphasis on barriers to healthy eating and the role of campus environments in food access contribution.

Findings indicate that students experience disproportionately high rates of food insecurity compared to the general population, with dire implications for academic attainment, health, and well-being. Financial and logistical challenges affect low-income students, while international students face additional barriers such as dietary acculturation, cultural adjustment, and limited familiarity with local food systems. Campus settings have significant impacts on dietary patterns. Inhibitors like poor affordability of healthy food, poor kitchen facilities, and limited access to transportation enhance dependence on cheap, unhealthy food. Effective interventions such as food pantries, community gardens, and cooking classes have shown promise to promote food literacy and nutrition but are applied unevenly and culturally restrictive currently. This review conveys that intentional campus planning with affordability, accessibility, and inclusion offers possibilities to improve the food security, health, and equity of college students

Keywords

Healthy Food, Student Food Insecurity, International Students, Campus Design

Introduction

Unhealthy diets are one of the leading determinants of non-communicable diseases worldwide, accounting for millions of deaths and tremendous losses in quality-adjusted life years (Afshin et al., 2019; Roth et al., 2020). This transition from adolescence to young adulthood is a vulnerable phase for developing health habits that last a lifetime, but this period is characterized by unhealthy diet, weight gain, and eating issues (Winpenny et al., 2018; Maillet & Grouzet, 2023; Assilian et al., 2024). College-aged students aged 18–25 years are one of the priority populations for public health nutrition interventions because this age group of individuals has some of the highest percentages of overweight and obesity gain in the United States (Deliens et al., 2013). These days, there is a growing need to create learning environments that support the holistic needs of students (Bassaw et al., 2025).

Food insecurity, or the insufficient ability to obtain access to food to maintain a healthy and active life, is an increasing concern in higher education (Assilian et al., 2024). Up to 41% of American university students have experienced food insecurity, significantly outpacing the nation's average of 10% (Nikolaus et al., 2020). The situation has been linked with worse academic success, physical health deterioration, and adverse psychological consequences (Loofbourrow & Scherr, 2023). International and low-income students are particularly at risk with fewer financial resources, cultural adjustment, and accessing affordable, nutritious food (Shi et al., 2020; Brown, 2016; Soldavini et al., 2019).

The campus-built environment integrates these concerns even further. Food environments, such as the physical, social, and economic environments that influence what is consumed (Swinburn et al., 2013), strongly influence student diets. Access to eating places, cost of healthy food, access to home kitchen facilities, and access to transport affect food security and dietary intake collectively (Roy et al., 2019; Zigmont et al., 2021; Dhillon et al., 2019). Moreover, international students are also likely to experience language barriers, dietary acculturation, and limited awareness of available facilities, all of which are likely to promote unhealthy dietary practices (Edwards et al., 2010).

Despite these challenges, the potential for campus planning to have a healthy influence on food choices is enormous. Initiatives such as food pantries, community gardens, better housing, and walkable or bikeable campuses have reported beneficial impacts on students' health and nutrition (Horacek et al., 2018; Loso et al., 2018; Fergus, 2024). However, little empirical research has investigated the relationship between campus planning and food security among international and low-income students. Addressing this gap is critical to the development of inclusive solutions that enhance the health, academic success, and overall well-being of students.

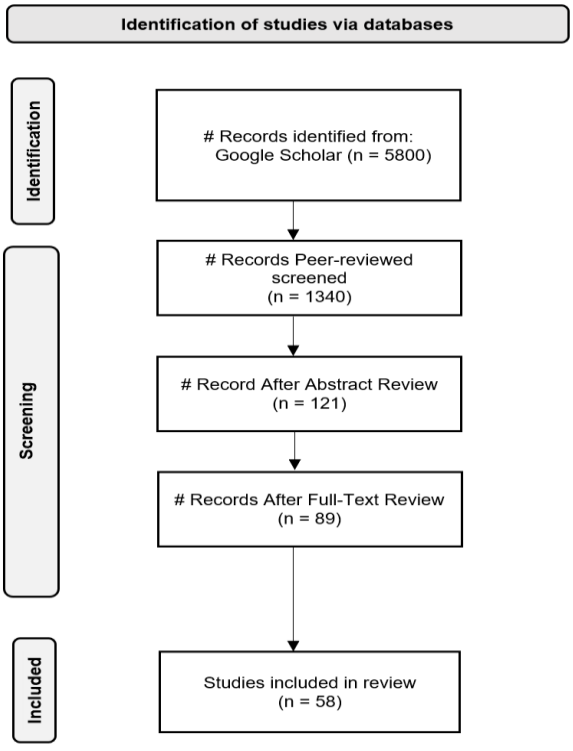
Methodology

This study followed a narrative literature review methodology to explore how campus design influences healthy food choices among low-income and international college students. This narrative literature review employed a rigorous five-stage methodology (identification, screening, eligibility, inclusion, synthesis). A comprehensive search of Google Scholar (2000–2025) utilized Boolean operators with keywords: (" Healthy Food ") AND (" Student Food Insecurity ") AND (" International Students ") AND (" Campus Design, " OR "University environment"). The initial yield of 5800 records was screened. Non-peer-reviewed articles were removed, resulting in 1340 peer-reviewed studies. After reviewing abstracts and applying inclusion criteria (their relevance to food access and eating behaviors in college settings particular focus on studies involving low-income and international students) resulted in 121 studies for further analysis. From these, the 89 most relevant articles were selected for in-depth full text review, prioritizing recent publications with high citation impact. The final 58 studies underwent data extraction using a standardized framework as shown in figure 1. Thematic analysis was done to address two research questions:

1. What are the key barriers to healthy eating and food security for low-income and international college students?
2. How does campus design influence access to healthy food for these student populations?

Figure 1.

Flow Chart illustrating key steps in the literature review and analysis



Note. This PRISMA-style diagram has been provided to enhance clarity and transparency. The current study did not involve a systematic literature review.

Literature review

1. Food Insecurity and Dietary Challenges Among College Students

1.1 Prevalence and Impact

Unhealthy diets are among the major causes of non-communicable disease illness and death worldwide. The primary drivers of such diseases are dietary risk factors that contribute to over 7 million deaths, and 199 million quality-adjusted life years lost every year (Afshin et al., 2019; Roth et al., 2020). However, this age stage more and more reflects a pattern towards less healthy eating patterns (Winpenny et al., 2018), misshapen patterns of eating behavior (Maillet et al., 2023), and weight gain (Assilian et al., 2024). In America, the highest increases in obesity and overweight have been observed among 18–29-year-olds, especially college-educated (Deliens et al., 2013). Young adults aged 18–25 years, including university students, are considered a high priority target for public health nutrition interventions, particularly because young adulthood is a stage of transition in adopting new health behaviors (Deliens et al., 2013).

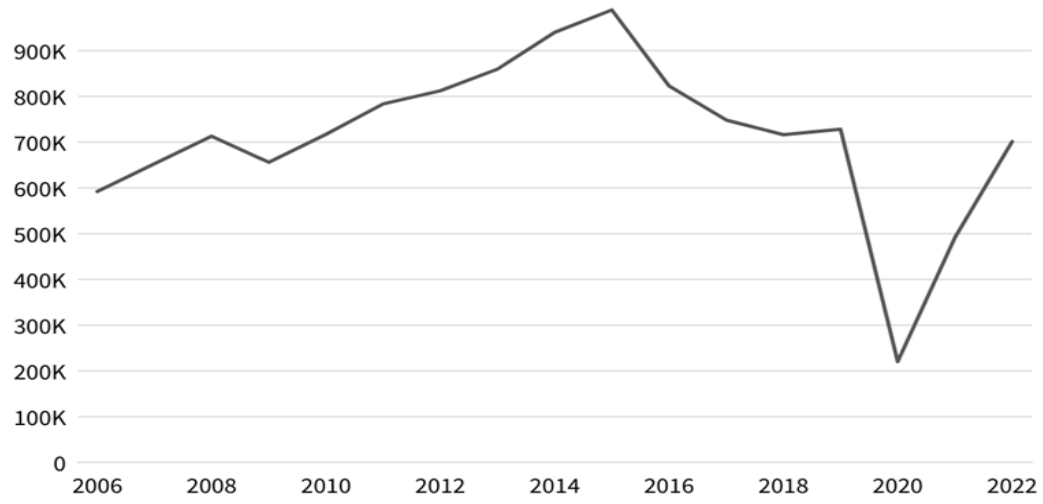
Food insecurity rates, as a measure of the lack of appropriate access to adequate food to ensure a healthy and active lifestyle (Assilian et al., 2024), also exist among students at higher education institutions, with potential negative effects on academic performance as well as on physical and emotional well-being (Loofbourrow et al., 2023). 41% of US higher education students were food insecure, a figure higher than the 10% national average, in a recent scoping review (Nikolaus et al., 2020). Providing descriptions of interventions most likely to improve diet quality and food security among students is, therefore, a valid and relevant aim.

1.2 Low-Income and International Students

As globalization is increasing, international students in tertiary education are growing worldwide (Shi et al., 2020). School is the second most common reason for recent immigrants to come to the US. In 2022, 701,945 people came to the US as students (USA Facts, 2023). Figure.2 displays, according to USAFacts (2023), international student immigration to the United States from 2006 to 2020. Except for the year 2020, due to the COVID-19 pandemic, no year had fewer than 600,000 people, which shows the relevance of this population to be considered.

Low-income students are likely to struggle with poor finances. International students in the US are even more vulnerable to food and nutritional insecurity compared to other college and university students. (Shi et al., 2020) Just like domestic students, international students face financial barriers to food access, leading to relying on less expensive, less nutritious food. In addition, international students in the US experience dietary acculturation, or adopting cultural norms, a barrier to food security and healthy eating (Brown, L., 2016). However, there are few examinations of food and nutrition security experiences of international students. (Soldavini et al.,2019).

Figure 2. Total Immigrant student arrivals to the US, 2006–2022



Source: U.S. Department of State

1.3 Key Barriers to Healthy Eating

Barriers to healthy eating habits and food security in higher education students involve lack of time, poor cooking skills, and a lack of finances (Zigmont et al., 2021), But also unhealthy campus food environments (Roy et al.,2019). More broadly described as "the collective physical, economic, policy and sociocultural surroundings, opportunities and conditions that influence people's food and beverage choices and nutritional status" (Swinburn et al., 2013).

Hanna, L. (2014) carried out research in the U.S with college students on food insecurity through surveys and semi-structured interviews to create a more descriptive knowledge of the experience of food insecurity among students. The result of this study has set the major determinants of food insecurity in universities as Financial limitation to buy food, Time limitation to shop, prepare, and consume, Lack of ability to cook or lack of funds, No means of transport, Time and financial needs expose commuters to risk, Family background of financial hardship or food insecurity. Because 62% of all the foreign students in America pay for their education from personal or family resources, foreign students constitute a considerable financial market for the Higher Education sector (Cahill & Stavrianeas, 2013). Students find that eating and maintaining a healthy lifestyle while overseas is riddled with challenges. There is poor information, expense, and poor availability of healthy food (Edwards et al., 2010).

According to another study has been done by Pradhananga et al., 2025, Most campus food pantry use barriers were a result of campus food pantry characteristics. Throughout the course of this research, Participants frequently expressed dissatisfaction with food quality at the campus food pantry, including expired food, bruised vegetables and fruits, and occasionally inedible items. Limited access to fresh fruits and vegetables was also reported to cause some international students to question whether it was worth going to the pantry. Another barrier that was reported was the promotion of the campus food pantry.

2. Built Environment Features Affecting Healthy Food Choices

2.1 Dining Location, Accessibility, and Marketing Impacts

The food environment is composed of various factors, including food availability, marketing practices, and where food is sourced, and all these shape dietary habits (Mann et al., 2021; Caruso et al., 2025). Recent studies highlight that food quality, accessibility, and convenience are among the strongest forces influencing food consumption among campus students. For example, in a campus food preference survey, students most frequently cited the cost of healthy food as a general issue, and many chose what to eat based on how convenient the site was to their classes (Kanosvamhira, 2025). Access and exposure to fresh food (such as fruits and vegetables) can support nutritionally appropriate choices of food (Buyuktuncer et al., 2014).

Based on the feedback of this study's informants and consistent with what has been reported (Sleddens et al., 2015; Deliens et al., 2014), the combination of academic stress and unavailability of a dependable mode of transport appears to be a college student-specific circumstance that renders convenience an important barrier to the intake of food that affects the quality of their food. Factors associated with ease of access to food were powerfully conveyed as playing a very important role in eating habits.

Proximity to food sources on campus was reported by students to have a strong influence on the eating pattern. Proximity to sites selling energy-dense foods and inconvenient location and timing of fresh produce shops were reported as barriers to healthy eating (Dhillon et al., 2019). Unhealthy food environments result in increasing food insecurity and unhealthy eating habits, like those of poor access to good, cheap eating places through unavailability or proximity, and the increased occurrence and accessibility of unhealthy, cheap fast-food establishments leading to unhealthy eating habits (Tyrrell et al., 2017). Interventions like the University Food Environment Assessment (Mann et al., 2021) have been constructed to test healthfulness against, and systematic reviews have called for more standardized testing protocols (Dahl et al., 2024; Turner et al., 2023). Indicators press that changing campus food environments, through mechanisms like offering healthier, yet more affordable, food and controlling food advertising, would impact student diet and health significantly.

2.2 Kitchen Availability and Housing Infrastructure and Food Literacy

Besides access to dining facilities, the ability of students to prepare meals themselves is determined by housing infrastructure as well as availability of kitchen facilities. There is limited evidence that food-insecure students are less likely to cook and have less confidence in cooking (Knol, 2019) compared to food-secure students. Further, students demonstrate moderate levels of confidence in preparing meals regardless of the food security status, though these are referred to in individual universities. Food-insecure students will probably have lesser resource adequacy when it comes to food preparation, but this study's variable encompassed various dimensions of adequacy like money, time, and skills (Gaines, 2014). Gaines et al. (2014) found a relationship between food security and food preparation resource adequacy but encompassed money, time, appliances, and skills in one measure of adequacy and did not distinguish kitchen infrastructure. In terms of cooking culture and availability of kitchen amenities, the colleges can partner with the dining services to create environments where the students are encouraged to cook by themselves and enhance their cooking skills (Machado, 2025). Students who live alone commonly reported poorly stocked kitchens as a barrier to home preparation of healthy meals. Restricted kitchen area, restricted appliances for cooking, and inability to multitask during cooking appeared to be frequently mentioned (Jurado-Gonzalez, 2025). To overcome the limitations, students have proposed several pragmatic interventions aimed at aiding cooking self-efficacy as well as improved nutritional outcomes (Miller, 2023). Cooking demonstrations, cooking classes, and cooking clubs were mentioned to be at the core of most solutions. Most students reported other barriers being associated with barriers to

meal preparation. For example, if their cooking skills are improved, cooking would help reduce time overall and potentially improve the quality and diversity of their diet nutritionally (Miller, 2023).

2.3 Transportation, Walkability, and Student Mobility

Although college students have been well studied, the campus-built environment is under researched (Goodwin, S. K., 2011). To our knowledge, limited research studies have investigated the interplay between college campus-built environment and health behaviors among college students (Molina-García et al., 2010). The campus environment is also a potential setting to have an indirect effect on emerging adults' lifestyle trends during emerging adulthood. College campus studies report that increased walkability and bikeability is linked to healthier living—higher walkability or bikeability scores were observed among campuses with greater student levels of physical activity and lower BMI (Horacek et al., 2018). College students are not guaranteed access to public transit; some campuses do not have any public transit at all (Crespi et al., 2021), and public transit which does exist on other campuses remains to be affordable for students (Martinez et al., 2021; Price & Curtis, 2018).

In fact, it is said that transport costs can comprise almost 11% of a student's college budget (Price & Tovar, 2023). The theme of public transport was mentioned in five articles (Landry et al., 2024). One of the overtones was constrained access or arrangement of public transport that makes it difficult for pupils to be capable of using programming, and challenges faced by pupils when required to carry food on public transport. Efforts to bunch grocery expenses and share meals may be bureaucratically challenging, which in certain situations resulted in late grocery buying and unnecessary consumption of fast foods (Fernandez, 2019).

2.4 Community Gardens, Local Food Infrastructure: Groceries and Food Pantries

2.4.1 Community Gardens

Conceptual models such as that of Lovell and colleagues suggest many community and health benefits of gardening, and in particular in shared spaces (Lovell, 2014). Contact with nature has been established to promote emotional, mental, and spiritual well-being, reduce stress, and bring about beneficial changes in mood (Dianat et al.,2025). Gardening is a physical activity and may also address food and nutrition determinants, through fruit and vegetable production and consumption (Hume, 2022). Community gardening can facilitate networks, alongside other more general community-level dynamics such as social cohesiveness and neighborhood attachment (Lovell, 2014). Previous articles have reviewed the evidence primarily for the effect of community gardening on food and nutrition-related outcomes. Loso et al. undertook a review of studies examining urban gardens and food and nutrition-associated results among adults, with outcomes showing positive impacts on fruit and vegetable consumption, dietary access to nutritious food, as well as improved food perceptions such as the value of organic production and cooking (Loso et al., 2018). A previous cross-sectional analysis of 1121 freshmen from eight universities discovered that students with a history of gardening during childhood and more recently had greater fruit and vegetable intake compared to the students without gardening experience (2.5 ± 0.6 vs 1.9 ± 0.5 cup equivalents (CE), respectively; $p < 0.001$) (Loso et al., 2018). Findings report that childhood gardening experience can be an important foundation upon which college students build the interest or inclination to pursue gardening experience while in college. Gardening can be a useful strategy in promoting fruit and vegetable consumption among college students. While isolated experiences can be effective in this cause, between-year consistent experiences would appear to be important for long-term continued gains. Colleges and universities can consider the creation of garden initiatives that offer serial gardening experiences throughout a student's lifetime to promote improved student health and well-being (Staub et al., 2019).

2.4.2 Local Food Infrastructure: Groceries and Food Pantries

The campus food pantry was related to food insecurity in the sense that the pantry was an intervention that had been put in place to improve student food access, which has some influence on academic performance (Fergus, 2024). Linda Fergus's (2024) study provides cross-sectional evidence that campus food pantries can play a role in increasing daily intake of fruit and vegetables (F/V) in university students experiencing food insecurity (Chodur, 2024). A Washington, D.C., area survey of 440 households reported that local food systems such as farmers' markets offer promising avenues for improving nutritional access. A 1% increase in market utilization was linked to a 6.5% rise in fruit and vegetable consumption and a 9.4% increase in daily meal preparation time. They also found qualitative evidence that shopping at farmers' markets improves access to and increases consumption of healthy food (Hu, 2021).

Discussion

Findings of this review highlight the interaction between individual, social, and environmental determinants influencing food security and dietary habits among college students with uneven effects on international and low-income individuals. Consistent with earlier studies, the prevalence of food insecurity among students is much

higher than the national prevalence, and it demonstrates structural barriers to higher education (Nikolaus et al., 2020; Loofbourrow & Scherr, 2023). For international students, matters extend beyond financial disadvantage to include cultural adjustment, dietary acculturation, and language barriers, all of which can hinder access to healthy food (Brown, 2016; Shi et al., 2020; Edwards et al., 2010).

On-campus food environments play the focal role in shaping students' food patterns. Increased availability of unhealthy, affordable foods and decreased affordability and accessibility of healthy foods create environments for poor diets (Roy et al., 2019; Zigmont et al., 2021; Dhillon et al., 2019). This is in keeping with Swinburn et al.'s (2013) food environment theory of complex spaces where affordability, accessibility, and sociocultural contexts converge to affect health. Specifically, the ease of obtaining fast food and the absence of fresh produce stores have been cited as obstacles to eating well (Tyrrell et al., 2017).

Built environment characteristics, including dining place, domestic infrastructure, and transport, become significant predictors of the dietary habits of students. The students with inadequate kitchen facilities or culinary expertise possess lower levels of self-confidence and lower preparation of healthy foods (Knol et al., 2019; Gaines et al., 2014). In the same way, unavailability of walkability and unaffordable or unreliable transportation constrain the capacity for access to healthier food sources, which results in fast food dependency (Horacek et al., 2018; Crespi et al., 2021; Price & Curtis, 2018). On the other hand, innovative campus initiatives such as food pantries and community gardens offer potential solutions. Evidence shows garden experience correlates with increased fruit and vegetable intake (Loso et al., 2018; Staub et al., 2019), while food pantry use has the potential to increase nutritional status and academic performance (Fergus, 2024; Chodur et al., 2024). Concerns about pantry quality, stigma, and inconsistent availability of fresh produce, though, suggest continuing limitations (Pradhananga et al., 2025).

This review indicates that campus planning can be considered not only a built environment but an equity system as well. Interventions to enhance affordability, accessibility, and education function most effectively when they occur within supportive settings. For example, the inclusion of cooking facilities and skills courses in residential college accommodation, the provision of walkable access to healthy food stores within affordable price points, and the enhancement of culturally representative foods can overcome most barriers established in the literature (Miller, 2023; Jurado-Gonzalez, 2025; Machado, 2025). The fixing of such problems through intentional design is particularly urgent for low-income and international students, who remain at risk of nutritional insecurity despite their needs becoming more widely recognized.

Conclusion

This literature review demonstrates that campus design is a critical but underutilized determinant of food security and healthy eating among low-income and international students. The evidence shows the mechanisms through which economic limitation, cultural adaptation, and structural limitation interact to create unequal health risks for these students (Shi et al., 2020; Soldavini et al., 2019). Additionally, the campus food environment, like affordability, accessibility, housing infrastructure, and transport, significantly impacts dietary intake, academic performance, and overall well-being (Roy et al., 2019; Horacek et al., 2018).

Although alternatives such as school gardens, meal programs, and food banks are promising, they remain implemented in an ad hoc manner and rarely address root causes such as affordability, cultural appropriateness, and infrastructure limitations (Fergus, 2024; Pradhananga et al., 2025). Future research and practice must therefore be holistic in scope and consider physical design, policy, and support systems for students. Campus plans that foster walkability, incorporate accessible cooking facilities, offer culturally relevant healthy food options, and support community-based food initiatives can reduce inequities and encourage healthier living.

Ultimately, it is critical that all students, and particularly low-income and international students, have fair access to healthy food as a matter of both public health and educational achievement and long-term social well-being. Universities, policymakers, and designers all have a role in making campus settings that facilitate healthy choices and support more resilient and inclusive communities.

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