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Food Insecurity among College Students in the United States: A Mini Review

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Abstract

The objective of this study was to analyze literature on prevalence, risk factors and consequences of food insecurity among college students in the United States. The authors selected articles published between 1996 and August 2016 utilizing search terms: food insecurity and college students. Eight studies were identified for review. The prevalence of food insecurity among the sampled college students was found to range between 14.0 and 58.8%. Majority of the studies found that race and housing situation are significantly associated with food insecurity. Four studies found that food insecure students are significantly likely to have lower GPA's. Food insecurity is a considerable problem among college students. There is an urgent need for campus administrators and policy makers to come up with programs and safety nets to assist hungry students to facilitate and support their academic success.

Keywords: College Students; Food Insecurity; Food Security

Abbreviations: USDA: United States Department of Agriculture; HFSSM: Household Food Security Survey Module

Introduction

Food insecurity is defined as a circumstance that exists "whenever the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways is limited or uncertain". Food insecurity is brought about by circumstantial and economic barriers that bring about challenges that limit access to sufficient and nutritious food by certain populations [1]. Food insecurity is also impacted by lack of food and financial management skills for example food preparation and budgeting for expenses [2].

Per United States Department of Agriculture (USDA), food security can be categorized along a continuum from severe to least severe: very low food security; low food security; marginal food security and high food security. The very low food security category indicates severe food hardship [3]. This means that households or individuals in this category undergo the most acute form of food insecurity measured in the US [4]. Low food security is the less acute form of food insecurity but also indicates that access to adequate nutritious food is challenging. Household members or individuals in this category are often forced to consume nutritionally inferior foods, which lack variety and may be insufficient in quantity because they are economically challenged [4]. Households or individuals that are classified as having marginal food security experience anxiety over potential food shortages, nonetheless they are still able to afford sufficient nutritious foods to consume. Despite experiencing some concern about potential inability to access adequate food, households in this category maintain normal diets throughout the year. Households or individuals in the high food security group have resources to sustain sufficient nutritious diets. These households experience no barriers to accessing nutritionally adequate food and they never face any food shortage. In the US, this is the highest level of food security [4].

The latest statistics on food security in the United States indicate that 14.3% of the total population is food insecure and of that, 5.6% experience very low food security level [5]. There are populations that are disappropriately affected by food insecurity and these include: Black and Hispanic Households (25.1% and 26.2%), low income households with income below 185.0% of the federal poverty guidelines (34.5%) and single-female households with children (36.8%) [6]. Although a small portion of college students comprise these high-risk populations, very few studies have investigated the prevalence of food insecurity specifically among this population [7-9]. Studies investigating prevalence of food insecurity among college students suggests that they experience food insecurity at significantly higher levels than the national average [7,8]. College students are primarily vulnerable because of the increase in the cost of higher education and recent changes to federal loan policies regarding the duration and total amount of federal aid received translate to budget demands (e.g., textbooks, health care) that compete with food dollar allocation [10]. Undesirable nutrition and non- related nutrition problems have been linked with food insecurity across all age groups [11]. Food insecurity among college students can impact academic

performance and health and social outcomes such as poor self-image [8]. Addressing food insecurity among college students should be a national priority.

Food insecurity is a public health concern and reducing its prevalence is a national priority as outlined in the *Healthy people 2020* goals. *Healthy people 2020* is a government initiative that bring together individuals and agencies with the aim of improving the health of Americans through health promotion and disease prevention. *Healthy people 2020* has made it a priority to reduce the prevalence of food insecurity in US households from the current 14.5% to 6.0% and to eliminate very low food insecurity in households with children by the year 2020 [12]. Food insecurity is a public health concern and reducing its prevalence is a national priority as outlined in the *Healthy people 2020* goals. *Healthy people 2020* is a government initiative that bring together individuals and agencies with the aim of improving the health of Americans through health promotion and disease prevention. *Healthy people 2020* has made it a priority to reduce the prevalence of food insecurity in US households from the current 14.5% to 6.0% and to eliminate very low food insecurity in households with children by the year 2020 [13].

Theoretical Framework

The risk factors for food insecurity among college students have not been fully understood because previous studies have mainly focused on low-income households. Alaimo [14] proposed a conceptual model for food insecurity. This model outlines: causes, experiences linked to, coping and, consequences of food insecurity. This model proposes that the risk of food insecurity is increased by financial hardship, poor cooking skills, poverty and unemployment. It further proposes that optimization of food resources through knowledge and skills and participation in food assistance programs can improve food security status [14]. Based on Alaimo's The highlighted should be as follows (Alaimo, 2005) model of food insecurity and results from a few studies on the prevalence among college students [7-9,14] a student specific model was developed by Gaines et al. [15]. This model shows student-specific risk factors which includes increased cost of tuition and housing, low income and inadequate financial and food management skills, increased reliance on borrowed money and ineligibility for food assistance programs [15].

Purpose

There is limited scientific information on the food insecurity levels among college students in the US and most of the available studies' results cannot be generalized to entire campus populations due to small sample sizes [9,16-18]. The purpose of this study is to provide a review of studies that assessed the prevalence of food insecurity among college students.

Methods of Measuring Food Insecurity

There are currently three scales for measuring food insecurity in the US: Community Childhood Hunger Identification Project (CCHIP) hunger index [19]. Radimer Cornell measure of hunger and food insecurity [20] and the US Household Food Security Scale Module (HFSSM): 18 items for households with children; 10-items for households without children; and 6-items short form of the HFSSM) [4]. The HFSSM is the most extensively used and validated measure. It is a superior tool because it distinguishes various levels of severity of food insecurity; very low food insecurity, low food insecurity, marginal food insecurity and high food security [4].

Food Security Scoring

The USDA procedures for calculating food security levels are used to determine the participants' food security status; the number of confirmatory answers are counted. Confirmatory answers are counted for answering *often true* or *sometimes true* to the 4-point questions and answering *yes* to *yes/no* questions. The confirmatory answers are summed and the total counts as the participants' score. Scores of 0, 1-2, 3-5 and ≥ 6 mean that the participant has high, marginal, low, and very low food security respectively [3].

Methods

Literature Search and Inclusion Criteria

The databases PubMed and Education Information Resources Center (ERIC) (1996 to August 2016) were searched for peer reviewed journal articles meeting the pre-set inclusion criteria. The key words used in literature search included: *college students, food insecurity, food security status, institutions of higher learning, post-secondary education, tertiary institution and university students*. The related articles function in PubMed was used to identify additional studies. The search engine Google scholar and its related articles function was used to search for additional articles. Peer reviewed studies that were conducted within the last 20 years and that reported prevalence of food insecurity among college students in the United States were included irrespective of the study design. Studies were included if they used the HFSSM survey instrument (18 items for households with children; 10-items for households without children; and 6-items short form of the HFSSM) to collect data and characterized their participants as having marginal food security, low food security, and very low food security or as food secure or food insecure.

A total of 28 studies were potentially eligible. A total of 21 studies were excluded because of the following reasons: 10 were conducted outside the United States, 4 were commentaries, 4 were unpublished research, 1 was an opinions and perspectives article and 2 were conducted in community colleges. The review consequently included 8 studies.

Results

Review

A total of 8 studies [7,9,15,16,21,23-25] qualified to be included in this mini review. The study characteristics are presented in Table 1 and summaries of key findings of each study are in Table 2. Different variations of the USDA HFSSM instrument were used to collect data for the studies included:

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4-item [16], 6-item [9, 21,23], 10-item USDA HFSSM [7,15,25] and modified USDA HFSSM [24]. Most of the studies [7,15,21,23] classified food security status into four categories: very low food security; low food security; marginal food security and high food security; and others [9,16,25] collapsed the categories into 2: food secure and food insecure.

Table 1: Characteristics of Included Studies.

Author (s), Reference, Publication Date	Survey Instrument	Participants	Categories of Food Insecurity Reported	Region of the United States
Chaparro et al. [7], 2009	10-Item USDA HFSSM	n=410 sophomores, juniors, seniors	4	Pacific
Patton-Lopez et al. [9], 2014	6-ItemUSDA HFSSM	n=354 undergraduates	2	Northwestern
Gaines et al. [15], 2014	10-Item USDA HFSSM	n=557 sophomores, juniors and seniors	4	Southeastern
Freudenberg et al. [16], 2011	4-ItemUSDA HFSSM	n=2, 200 undergraduates	2	Northeastern
Martinez et al. [21], 2016	6-Item USDA HFSSM	n=8,932 undergraduate and graduate students	4	West Coast
Mirabitur et al. [23], 2016	6-Item USDA HFSSM	n=514 undergraduate and graduate students	4	Midwestern
Bruening et al. [24], 2016	2-item modified USDA HFSSM	n=209 freshmen	2	Southwestern
Morris et al. [25], 2016	10-ItemUSDA HFSSM	n=1,882 undergraduates	4	Midwestern

Table 2: Summary of Key Findings.

Author (s), Reference, Publication Date	Key Findings
Chaparro et al. [7], 2009	Students living off-campus or on campus were more likely to be food insecure than students living with parents or relatives (OR=2.98, 4.96 and 5.01, respectively).
Patton-Lopez et al. [9], 2014	Employed students were more likely to be food insecure (OR=1.73, 95% CI: 1.05-2.88) and students who had GPA ≥3.1 were less likely to be food insecure (OR=0.40, 95% CI: 0.22-0.69).
Gaines et al. [15], 2014	Financially independent students had significantly higher risk for food insecurity (P=0.001).
	Students who tracked their expenses were more likely to be food secure.
Freudenberg et al. [16], 2011	Students working more than 20 hours a week were more likely to be food insecure than those who did not work for pay.
	Food insecure students were 2 times likely to be depressed than food secure students.
	Additionally, 24.3% food insecure students reported housing instability too.
Martinez et al. [21], 2016	Food insecure were more likely to report they had to suspend studies due to financial hardship as compared to food secure students (10.0% Vs. 3.0%).
	Food insecure students (43.0%) reported eating cheap food even if it was not the healthiest.
	13.0% of students reported having difficulties studying because of hunger and no money.
Mirabitur et al. [23], 2016	Students without car access were 2.7 times more likely to have low food security level than students with car access 95% CI: 1.09-4.59; p=0.03.
	Students in housing where food is not provided were 2.7 likely to be food insecure.
Bruening et al. [24], 2016	Food insecure students had lower odds of eating breakfast as compared to food secure students (P ≤0.05).
	Food insecure students had higher odds of depression (OR 2.97, 95% CI: 1.58-5.60)
Morris et al. [25], 2016	Living situation was significantly associated with food security status (X^2=42.064; p <0.001).

Gender, Race/Ethnicity and Food Security Status

Female participants were overrepresented in all the studies. Three studies [7,16,21] found that security status was significantly associated with race. African American /Black students, Asian and Hispanic/Latino students were more likely to be food insecure as compared to White students [21,24]. A study [7] that was conducted at the University of Hawaii at Manoa found that Japanese students were more likely to be food secure as compared to Hawaiians, Filipinos, Pacific Islanders, and students with multiple ethnicities.

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Housing Situation

Two studies [7,23] found living situation to be significantly linked to food security status. Students living off-campus with guardians, parents, or relatives were likely to be food secure as compared to students who live on or off-campus alone, with roommate(s) or a spouse [7]. One study [23] found that students who resided in housing where food is not provided were 2.7 times likely to be food insecure. Food insecure students were found to also experience housing instability in one study [16].

Financial Situation and Work for Pay

Financial independence [15] and employment [9,16] were found to be positively associated with food insecurity. One study [16] reported that students who worked more than 20 hours a week were more likely to be food insecure as compared with students who did not work for pay. Additionally, 38.0 % of food insecure students in one study reported increasing their hours of work to cope with financial hardships. Other food insecure students reported asking for financial support from parents or friends to make ends meet [21]. Further, one study [21] found that 13.0% of food insecure students had difficulties studying because of hunger and no money and were likely to suspend studies due to financial hardship as compared to food secure students (10.0% Vs. 3.0%) (Table 1).

Breakfast and Eating Patterns

Three studies [16,21,25] examined the effects of food insecurity on dietary behaviors and coping mechanisms of food insecure students. One study [25] reported that the odds of consuming breakfast, regular and meals were inversely associated with food insecurity. Collectively, the studies found that food insecure students reported going without meals for the whole day [16], reducing the size and quality of meals [21] of meals because they did not have sufficient funds to buy food. Food insecure students were also found to be more likely to procure food from fast food restaurants than food secure student [21] (Table 2).

Grade Point Average

The correlation between food insecurity and grade point average (GPA) was investigated by two studies [9, 21]. These studies found that food insecure students were significantly likely to have lower GPA's than food secure students. One study [9] reported that students who had GPA ≥3.1 were less likely to be food insecure (OR=0.40, 95% 0.22-0.69). These findings are comparable to the finding that food insecure students reported lower GPA (mean = 3.1) than food secure students mean=3.4; $p<0.01$ [21].

Anxiety and Depression

Two studies [16,25] investigated the relationship between food insecurity and depression. Food insecure students were found to have significantly higher odds of reporting depression and anxiety (OR=2.97; 95% CI 1.58 to 5.60 and OR= 1.49; 95% CI 0.99 to 6.66) [25] and were 2 times likely to be depressed than food secure students [16].

Discussion

This review assessed prevalence and factors associated with food insecurity among college students in the US. The major factors associated with food insecurity identified include: anxiety, depression, financial hardships, GPA, housing situation, race and work for pay. Other factors associated with student food insecurity include car access, confidence towards cooking, credit card debt, eating patterns, financial independence, having children, income, marital status, participation in food assistance programs and spending patterns.

Food insecurity exists among college students as a problem that has not received adequate attention. There is very limited information about food insecurity among college students here in the United States and worldwide. The prevalence of food insecurity among college students in the studies under review range from 15.0 to 58.8%, which is higher than the national average (12.7%) [26]. In the past, college enrollment was essentially accessible to people of high economic status, but today it's accessible to people from all social classes including people with low socio-economic status [27,28] which creates dissonance on data linking poverty and low college attendance and educational outcomes [14,29].

The risk factors for food insecurity among college students are not limited to economic factors. College students are normally between 18-25 years of age, and often referred to as emerging adults [30]. Emerging adults often lack food management knowledge and skills, and therefore increasing their risk for food insecurity [14,15]. It is important to implement food and financial management interventions targeting college students, especially freshmen to improve their food and financial management skills and therefore decrease their likelihood of being food insecure.

Similar to the general population, there exists racial disparity in food insecurity among college students; African American and Hispanic students are at increased risk of being food insecure compared to White students [21,26]. Additionally, African Americans are more likely to have very low food security status as compared to other races [1]. Further research is needed to determine cultural specific risk factors for food insecurity and thus inform future interventions targeting underserved minority groups.

The cost of higher education over the last 30 years has overtaken the cost of living, inflation and medical costs [10]. Among college students, the budget demands for health care, housing, textbooks, tuition, and utilities compete with the food dollar [31]. Food insecure students report having to choose between paying for food or medicine, educational and housing expenses [21]. Another emerging problem among college students is housing insecurity. Increasing number of college students are at high risk of becoming homeless [32]. An

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accurate number of students experiencing homelessness is not documented because universities are not mandated to identify or keep track of such cases and due to associated stigma [33]. In 2013, estimates by Free Application for Federal Student Aid (FAFSA) indicated that approximately 58,000 students in higher institutions of learning were homeless nationwide [33]. There is an urgent need to document food and housing insecurity among college students to be able to set up appropriate policy and interventions to assist affected college students.

Food insecurity has been shown to have detrimental outcomes among college students. Food insecurity have negative effects on academic, cognitive, and psychosocial development [14]. A recent study found that food insecurity is a significant predictor of low self-esteem among African American college students [34]. Furthermore, food insecure students have significantly higher odds of reporting depression and anxiety [16,25]. There are adverse side effects associated with anxiety and depression among college students which include alcohol abuse, physical inactivity, poor sleep habits, poor dietary habits and smoking [35]. These side effects may contribute to poor health, poor academic performance and outcomes.

Food insecurity negatively influences dietary habits. Food deprivation and overeating has been observed in low income, food insecure individuals. As a coping strategy to stretch the food budget, food insecure individuals often skip meals or eat less and when food becomes available, they often overeat [36,37]. In a study that sort to establish the relationship of food insecurity and food and nutrient intake, a significant decrease in the intake of fruits and vegetables were associated with increased severity of food insecurity. Furthermore, intakes of fiber, potassium and vitamin C among the food insecure individuals were found to be below the Recommended Dietary Allowance [38]. Although there are no published studies that have explored the relationship of food insecurity and dietary patterns of college students, other studies have found that dietary patterns established during college years are likely to be continued throughout life [39] and insufficient diet during the college years can lead to nutrition related chronic diseases [40].

Limitations

In the studies under review, cross-sectional study design was used to collect data. In this design, self-reported data were collected, and therefore subject to several shortcomings for example social desirability and recall biases and misinterpretations of questions. The study participants were self-selected and therefore generalizations cannot be made to other student populations in other colleges. In the studies under review, quantitative assessment of food insecurity was carried out and therefore deeper insights into underlying factors contributing to food insecurity remain unclear. There is need to conduct qualitative research (focus group discussions and in-depth interviews) to gain a better understanding of the underlying causes of food insecurity among college students.

Conclusion

This mini review provides evidence that food insecurity is a significant problem among college students. There is need for a nation-wide assessment of the prevalence and correlates of food insecurity among college students to provide evidence for policy makers to formulate evidence-based strategies to reduce its prevalence and establish safety nets such as the free and reduced lunch program in the K-12 school system [6]. There is need to conduct longitudinal studies to investigate the impact of food insecurity on academic performance, college completion, and behavioral and social outcomes. Campus administrators should respond to food insecurity among their students by establishing and funding on campus food pantry and creating awareness on food access and student support services to provide them with opportunities for success.

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