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BURDEN OF FOOD INSECURITY AMONG COLLEGE STUDENTS: A CROSS-SECTIONAL STUDY DURING THE COVID-19 PANDEMIC

A Thesis

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Public Health

by

Saba Sami

May 2022

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Approved by:

Monideepa Becerra, Committee Chair, Health Science and Human Ecology

Benjamin Becerra, Committee Member, Information and Decision Sciences

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ABSTRACT

Background: Food insecurity is lack of access to proper nutrition for an individual to obtain a healthy lifestyle. The goal of this research is to determine the frequency of food insecurity among college students at a four-year college institution during COVID-19 pandemic in association to mental and physical health status.

Methods: This study was conducted among college students using crosssectional study method. All data were collection virtually and kept anonymous. All statistical analyses were conducted using SPSS version 28 with (p<.05), denoting significance.

Results: In the study there were a total of 98 participants who were being analyzed. All the participants were 18 years of age or older taking a part in this study, which resulted as preliminary for these college students by demonstrate that there was no significant association between the food insecurity with physical and mental health status during the COVID-19 pandemic. The primary variables of interest in this study were: food insecurity, general mental health status, and general physical health status during the pandemic. Prevalence of study participants who reported 34.7%, state sometime true that food they bought did not last and they did not have money to get more. Whereas 30.6% study participants who reported that they could not afford to eat balanced meals within the last 12 months. Participants in the study also report that in the last 12 months they or any other adults in their household had ever cut the size of their

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meals or skipped meals because there was not enough money for food. In the study about 19.4% states, they were very hungry but did not eat because there was not enough money for food. Financial hardship was a primary reason why participants were food insecure and could not afford to have a proper nutrition in-take.

Conclusion: Results highlight the importance public health efforts on prevalence of food insecurity among college students during the COVID-19 Pandemic.

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CHAPTER ONE:

LITERATURE REVIEW

Overview

Food insecurity is a global issue that has impacted society in all age groups. This study evaluates the burden of food insecurity among college students by financial economic hardships, examining the social determinants of health along with food insecurity, and contributing outcome findings. Conducting methods by using cross-sectional study design, gathering data collections, measuring, and analyzing the findings.

Food Insecurity

The U.S. The Department of Agriculture/Economic Research Service (USDA/ERS) defines food security as access by all people at all times to enough food for an active, healthy life and utilizes two key levels of measure: Food security and food insecurity. Food security is further divided as high food security, where there are no barriers or limitations to food access; and marginal food security, where one or two indications are noted, such as anxiety related to food amount in a household though changes to dietary habits are negligible. On the other hand, food insecurity is divided as low food security, where there is reduction in the amount, variety, desirability of food, though intake is not impacted; and very low food security where there is disruption of food intake and dietary pattern (*USDA ERS - Definitions of Food Security*, 2021).

Food insecurity statistics in 2020 by USDA reports that 10.5 percent (13.8 million) of U.S. households were food insecure at some time during 2020, which also includes low food security and very low security among these households (*USDA ERS - Key Statistics & Graphics*, 2021). Whereas 9.4 million adults were very low food security, and 6.1 million children and adults in households described were food insecure in the United States as of 2020 (*USDA ERS - Definitions of Food Security*, 2021).

Food insecurity has impacted individuals in various ways as to affecting their health outcomes that leads them to being diagnosed with chronic health conditions. Here are some health issues that are linked with food insecurity among households that have children; for example, higher risks of some birth defects, anemia, lower nutrient intakes, greater cognitive problems, higher levels of aggression and anxiety, being hospitalized, poorer general health, mental health issues, asthma, behavioral problems, and more instances of oral health problems (Gundersen, 2013). These are some factors that affect a household with food insecurity, which may influence the parent or the children with higher risk of any of these health conditions.

In addition, adults in households with more severe food insecurity are more likely to have a chronic illness associated with some similar factors but with

different outcomes. Due to being the ahead of the household, who is responsible for all the circumstances and situations as to financially, physically, mentally, and other well-being by providing the support to their families or as individually. The four levels of food security shows how adults are linked with chronic health illness by high and low percentage as to high food secure (37.4%), marginal food secure being (43.2%), low food insecure of (46.9%), and very low food insecure (52.7%) (Gregory, 2017). In adults that are experiencing food insecurity at any levels can be detected with any of these health concerns such as to lower nutrient intakes, mental health problems, physical health problems, depression, diabetes, higher levels of chronic disease, and worse outcomes on health exams. On the other hand, food insecurity that can be associated with seniors' health are having lower nutrient intakes, are more likely to be in poor or fair health and are more likely to have limitations in activities of daily living (Gundersen, 2013). Food insecurity can both increase existing medical issues as well as being diagnosed with totally new ones among all age groups, with physical or mental health behaviors to be determined.

Financial Burden-Economic Hardships

Food insecurity is a condition that develops from lack of money and number of resources to secure food. The measure of money a family spends on food in this manner demonstrates how sufficiently the family is meeting its food needs. In 2017, about 40 million people in the U.S. earned income less than the

poverty line. Almost 1 out of 8, live in households with restricted access to sufficient food during the year because of lack of money and other resources. Among the 40 million, more than 12 million are households with children facing systemic barriers for income stability due to living on income wages that are out of reach for some households to achieve (*Food-Insecurity-Poverty-*

Brief_2018.Pdf). People do not choose to be food insecure but are forced upon them due to the lack of extreme poverty issues where food is one of our most basic needs; to maintain our energy levels so we can have some access to healthy food. A family being not able to manage the cost of adequate, quality food associates with encounters of unemployment and destitution (*Food-Insecurity-Poverty-Brief_2018.Pdf*).

Determinants of Food Insecurity

Food insecurity does not really cause hunger, yet hunger is a potential result of food insecurity. Food insecurity may result in long or short-term depending on an individual's situation. This may be due to a few factors which can be associated with financial status, employment, disability, race, or ethnicity, education, and a variety of other factors that may lead a person or family towards food insecurity (*Food Insecurity and Food Insufficiency*, 2021). Employment being employed but receiving low-wage salary is a factor that may affect the household or receiving unemployment benefits with low payments can also lead to food insecurity. In 2016, low-income households were 2.6 times more likely

than the average American household to be food insecure (*Food Insecurity and Food Insufficiency*, 2021). Depending on where the household lives does affect them to be food insecure, such as access to food can be difficult depending on the neighborhood a person lives in as to urban areas, rural areas, and lowincome neighborhoods may have limited access to full-service supermarkets or grocery stores (Pruitt, 2016). Some of the neighborhoods throughout the U.S. lack grocery stores or markets that provide fresh food and produce. Instead, households in those neighborhoods are often left with unhealthy food access, for example fast food restaurants and convenience stores (*Food Insecurity and Food Insufficiency*, 2021). Neighborhoods that do not have access to proper nutrition foods are often referred to as food deserts, that is having difficulty buying affordable or fresh quality food near their living place.

Income status determines someone's neighborhood area, as does their race depending on that, for instance, wealthy neighborhoods have three times the number of grocery stores than poor neighborhoods. Majority white neighborhoods had four times the number of grocery stores than majority black neighborhoods and other race neighborhoods (*Food Insecurity and Food Insufficiency*, 2021). According to Healthy People 2020, food insecurity has affected an individual or household five different areas as to social determinants of health that leads to not having stable economic, education level, health and health care, neighborhood and built environment, and lastly social and

community content all are areas where food insecurity is being the number one cause or individuals and households (Coleman-Jensen, 2018).

Disability is another risk factor to food insecurity, that limits one's ability to work often which results in low income. Disabilities may affect someone physically and mentally depending on their injury level, which can lead them to seeking trouble managing income and limit their access to resources of basic needs. According to USDA one-third of households include an adult who is disable and is suffering from food insecurity and households with 38 percent with very low food insecurity (*USDA ERS - Key Statistics & Graphics*, 2021).

Another factor that may lead someone towards food insecurity is homelessness, who does not have access to most likely any of the daily basic needs for everyday use. Approximately 3 million people experience an episode of homelessness, which is associated with high rates of morbidity and mortality that experience unstable income (Kushel et al., 2006). Education is another social determinant that is a cause for food insecurity due to language and literacy barriers among a person to succeed. Determining the level of education does affect personal limitations on income, employment status as well as health care benefits, transportation and much more along the lines of insecurity. This may also impact someone's transportation access where it limits a person or household to walk by foot, using the bus, bicycle, or vehicle depending on the level of status. According to CDC, poor transportation cuts off access to many

food outlets especially for those who do not own a car or have no access to reliable and affordable public transportation (*Center of Disease Prevention Control*, 2014). All these factors are leading causes of food insecurity among a person or in a household, who do not have access, affordability, education, transportation, or come from low-income status.

Outcomes of Food Insecurity

Although hunger and food insecurity are similar, it is important to note the difference between the two before understanding the effects on a person's physical and emotional health. Hunger is the physical discomfort that results from the need for food. Food insecurity refers to the lack of financial resources for food. The level of food insecurity and its connection to poverty in America is a part of understanding the issue. Almost one out of three people (29.2%) universally experience a typical mental disorder during their lifetime, such as depression, anxiety, and somatic symptom disorders (*Elsevier Health Sciences*, 2017). The ramifications of food insecurity go farther than the physical and will quite often influence an individual's mental health also. However, food insecurity links essentially with every demographic, it's important to understand why children are particularly at high risk for the implications of food insecurity.

Generally, the prevalence of mental illness was 18.4% [95% CI 16.7–20.1] higher for women and 13.5% higher [95% CI 11.9, 15.2] for men in severely food insecure households compared with those reporting food security. The increased

risk of mental instability related with food insecurity was more articulated among females and those reporting higher stress and social isolation (Martin et al., 2016). Food insecurity negatively relates to academic performance and likely lowers social interactions among all age groups within children's, adults, and seniors. Which may lead a person to start or continue smoking cigarettes increasingly due to financially disadvantaged groups, and food insecurity also disproportionately impacts lower-income groups (Mayer et al., 2019).

College Students

The transition period from high school and college can be quite challenging for students. During this time, students are still trying to establish their identity; therefore, making them extremely vulnerable to unhealthy peer influences. College students may be a vulnerable group due to limited financial resources, having limited, or not having privileged access to federal aid, and rising costs of tuition, housing, and food (El Zein et al., 2019). First year college students are considered a vulnerable group because they experience considerable difficulty in managing a multiple task. For example, managing their finances, social support which may result from prolonged emotional and physical separation from their family and friends. This may affect their normal eating patterns, learning how to cope with the new environment for students that are away from home. During the first two years college students may have trouble accessing proper nutrition, limited income, resources to healthy food locations, physical health care and financial budget skills (El Zein et al., 2019).

College life increases an individual's risk of developing mental health disorder as to risk of experiencing stress, anxiety, and depression, which cause psychological distress and may impact on their academic performance. Worldwide, it is estimated that 12–50% of college students present at least one diagnostic criterion for one or more mental disorders (Ramón-Arbués et al., 2020). Mental health disorder is usually something some students notice in their adulthood life as they are stomping their feet in college as a new beginning. In addition, may affect that individually with their learning disabilities, self-injury incidents, eating disorders, substance use, and sexual assaults (Pedrelli et al., 2015). Experiencing mental health disorder usually leads that individual to a negative influence pathway where it can impact their life with the wrong gathering surrounding them. Which also affects college students' physical health leading them into skipping lectures, not getting enough sleep, poor nutrient intake, skipping meals, physical inactivity, and risk of health concerns. Some studies have shown that physical activity reduces stress, anxiety, and depression among adults, which is corresponding to mental health in connection to improving both mentally and physically when involved in out-going activity (VanKim & Nelson, 2013). A positive environment will lead a person to a progressive atmosphere and improve health outcomes by lowering depression, anxiety, or stress levels, when having encouraging change towards their physical health and well-being.

College students not only deal with mental or physical health problems but also, they deal with food insecurity issues that raise a trigger in mental and

physical health. According to a study done among college students report that about, 86% of students who experience food or housing insecurity informed that they had done one of the following because of their hunger or housing issues: missed a class, study session, or club meeting; opted not to join a co-curricular activity; did not purchase a textbook; or dropped a class or did not perform as well as they could have in their academics (Phillips et al., 2018). Students also attend to face food insecurity issues due to their color of skin, race, ethnicity, culture, income status, transportation, friend zone, and these are only few examples that disrupts or attacks an individual physically or mentally that send them to a situation of food insecurity. As well the increasing concerns about student loan debt and the rising costs of college, taking loan to pay for each semester unit, the cost of each textbook required for each course, plus the additional fees that imply with registering for each semester becomes costly to afford for college student and burdens them to limit their use of money. It is important to understand how students' financial situations may be related to their food insecurity status, going though these positions as a student disrupts their academic performances and health well-being (Pedrelli et al., 2015; Phillips et al., 2018).

Summary

Food insecurity has disproportionately impacted population in varies way as to the color of skin, race, ethnicity, and financial income status. College

students are one of the portions of the population are faced at higher level of food insecurity issues due to the cost of tuition, transportation, and fulfilling their basic needs. Students attend to struggle mentally and physically that attends to impact their nutrition; therefore, are unable to concentrate on their education and performance.

Purpose Statement

The purpose of this study was to evaluate the prevalence of food insecurity among college students during the COVID-19 pandemic.

Research Question (RQs)

Research Question #1

What percent of the study population reported that the food they bought just did not last, and they did not have money to get more?

Research Question # 2

What percent of the study population reported that they could not afford to eat

balanced meals?

Research Question # 3

What percent of the study population reported that in the last 12 months they or any other adults in their household had ever cut the size of their meals or skipped meals because there wasn't enough money for food?

Research Question #4

What percent of the study population reported the frequency with which the above happened?

Research Question # 5

What percent of the study population reported that in the last 12 months, they ever ate less than they felt they should because there was not enough money for food?

Research Question # 6

What percent of the study population reported that in the last 12 months, they were very hungry but did not eat because there was not enough money for food?

Research Question # 7

Is there a significant association between general mental health status and each of the above food insecurity variables?

Research Question # 8

Is there a significant association between general physical health status and each of the above food insecurity variables?

Significance To Public Health

The purpose of this study was to evaluate how food insecurity among college students has impacted students in different circumstances. Some aspects that contributed to food insecurity among college students were financial income status, cost of tuition, transportation, and fulfilling their basic needs. By

using a cross-sectional study method, the major findings that were reported determined that food insecurity among students is a factor that has affected student general mental and physical health status.

CHAPTER TWO:

METHODS

Study Design

The present study employed a cross-sectional approach to evaluate food insecurity among college students.

Data Collection

Data was gathered from students at a four-year public institution who were at least 18 years old. Those who met these requirements were considered. Participants were given an informed consent form and a virtual survey if they consented to participate. As an incentive, all participants got an extra five points. To avoid unintentional participants identification, all data was collected and kept anonymous, and a random sample was examined.

Population Characterization

The data was collected from these diverse communities by the department of general education and other undergraduate classes at a four-year public university in southern California. Students currently enrolled and aged 18 years or older were eligible to participate. Students also received extra credit for participation. The university has about 19,404 students' population, with majority females (63%), Hispanic (66%), low-income (58%), and undergraduates (85%).

Measures

The primary variables of interest in this study were: food insecurity, general mental health status, and general physical health status during the pandemic.

Food insecurity was measured using the following survey questions:

"'The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more.' Was that often, sometimes, or never true for (you/your household) in the last 12 months?"

"(I/we) couldn't afford to eat balanced meals.' Was that often, sometimes, or never true for (you/your household) in the last 12 months?"

"In the last 12 months, did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?"

"How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?"

"In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?"

"In the last 12 months, were you every hungry but didn't eat because there wasn't enough money for food?"

General mental health status was measured using the following survey question:

"How would you describe your general mental health status?"

General physical health status was measured using the following survey question:

"How would you describe your general physical health status?"

Data Analysis

To answer the following research questions, descriptive statistics was conducted. SPSS version 28 was used for all analyses.

1. What percent of the study population reported that the food they bought just did not last, and they did not have money to get more?

2. What percent of the study population reported that they could not afford to eat balanced meals?

3. What percent of the study population reported that in the last 12 months they or any other adults in their household had ever cut the size of their meals or skipped meals because there wasn't enough money for food?

4. What percent of the study population reported the frequency with which the above happened?

5. What percent of the study population reported that in the last 12 months, they ever ate less than they felt they should because there was not enough money for food?

6. What percent of the study population reported that in the last 12 months, they were very hungry but did not eat because there was not enough money for food?

To answer the next research questions, bivariate statistics (chi-square tests) were conducted. All statistical analyses were conducted using SPSS version 28. To determine significance, p value of less .05 was used. 7. Is there a significant association between general mental health status and each of the above food insecurity variables?

8. Is there a significant association between general physical health status and each of the above food insecurity variables?

Ethics

This study was approved by the university's Institutional review board (IRB-FY2022-146). The study followed the guidelines for human subject's research, as outlined in the Belmont Report to protect the rights of each participant. The Belmont Report consists of three principles which are respect for persons, beneficence, and justice (Protections (OHRP), 2018). Each of these principles are designed to protect the rights of human subjects as to rule number one respect for persons, meaning protection of individuals autonomy. Whereas, rule number two beneficence, meaning maximizing the benefits and minimizing the harm to protect the rights of individuals. Lastly, rule number three justice, treating every human subject equally by research of costs and benefits. Informed permission papers were issued to ensure respect for people and thus autonomy.

The study was completely voluntary, and participants were free to leave at any time without affecting their academic standing. All attempts were made to reduce damage and improve benefits to assure beneficence. To keep students from becoming bored, the questions were restricted to a bare minimum. The survey was made anonymous so that students didn't have to worry about being identified if they answered sensitive questions. During the study, a random sample was used to avoid creating cross-tabulations that could be used to indirectly identify participants in any rare cases. Finally, all college students aged 18 and above were eligible to participate, ensuring that no one group was burdened while another benefited.

CHAPTER THREE:

RESULTS

1. What percent of the study population reported that the food they bought just did not last, and they did not have money to get more?

As shown in Table 1, 56.1% reported never true that the food they bought just didn't last, and they didn't have money to get more. However, 9.2% reported often true that the food they bought just didn't last, and they didn't have money to get more. Whereas 34.7% reported sometimes true that the food they bought just didn't last, and they didn't have money to get more in the last 12 months.

Table 1. Prevalence of study participants who reported that the food they bought
did not last and they did not have money to get more.

	Percentage
Never true	56.1%
Often true	9.2%
Sometimes true	34.7%

2. What percent of study population reported that they couldn't afford to eat balanced meals?

As shown in Table 2, 54.1% reported that it was never true that they couldn't afford to eat balanced meals, as to 15.3% reported that it was often true that they couldn't afford to eat balanced meals. As well as 30.6% reported, that they it was sometimes true that they couldn't afford to eat balanced meals in the last 12 months.

Table 2. Prevalence of study participants who reported that they could not afford	
to eat balanced meals within the last 12 months.	

	Percentage
Never true	54.1%
Often true	15.3%
Sometimes true	30.6%

3. What percent of study population reported, that in the last 12 months they or any other adults in their household had ever cut the size of their meals or skip meals because there wasn't enough money for food?

As shown in Table 3, 67.3% reported that it was never true, whereas 9.2% reported that it was often true, and 23.5% reported that it was sometimes true that in the last 12 months they or any other adults in their household had ever cut the size of their meals or skip meals because there wasn't enough money for food.

Table 3. Prevalence of study participants reported that in the last 12 months they or any other adults in their household had ever cut the size of their meals or skipped meals because there was not enough money for food.

	Percentage
Never true	67.3%
Often true	9.2%
Sometimes true	23.5%

4. What percent of the study population reported how often this happen of ever cutting the size of their meals or skipping meals because there wasn't enough money for food in the last 12 months?

As shown in Table 4, 8.2% reported that almost every month, 1.0% reported almost every month, and some months but not every month. Whereas 67.3% did not answer the question, and 8.2% reported only in 1 or 2 months and 15.3% stated that in some months but not every month had they ever cut the size of their meals or skip meals because there wasn't enough money for food in the last 12 months.

	Percentage
Missing	67.3%
Almost every month	8.2%
Almost every month, Some months but not every month	1.0%
Only 1 or 2 months	8.2%
Some months but not every month	15.3%

Table 4. Prevalence of the study participants reported the frequency with which the above happened during the last 12 months.

5. What percent of the study population reported that the last 12 months, did they

ever eat less than they felt they should because there wasn't enough money for

food?

As shown in Table 5, 72.4% reported that no, and 24.5% reported that yes

that in the last 12 months, did they ever eat less than they felt they should

because there wasn't enough money for food.

Table 5. Prevalence of the study participants reported that in the last 12 months, they ever ate less than they felt they should because there was not enough money for food.

	Percentage
No	72.4%
Yes	24.5%
Missing	3.0%

6. What percent of study population reported that in the last 12 months, they were every hungry but didn't eat because there wasn't enough money for food?

As shown in Table 6, 79.6% reported no and 19.4% reported yes that in the last 12 months, they were every hungry but didn't eat because there wasn't enough money for food.

Table 6. Prevalence of the study participants reported that in the last 12 months, they were very hungry but did not eat because there was not enough money for food.

	Percentage
Missing	1.0%
No	79.6%
Yes	19.4%

Is there a significant association between general mental health status and each of the above food insecurity variables?

As Shown in Table 7, association between general mental health and reported that the food bought just did not last in the last 12 months.

Table 7. Association between general mental health and reporting food bought just did not last

Mental health status	The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more."	
	Never true	Often, sometimes true
Excellent, Good	61.1%	38.9%
Average, Poor	50.0%	50.0%

There was no significant association between general mental health status and the food that was bought just did not last and did not have money to get more in the last 12 months (p > .05).

As Shown in Table 8, association between general mental health and could not afford to eat balanced meals in the last 12 months.

Table 8. Association between general mental health and could not afford to eat balanced meal				
Mental health status "(I/we) couldn't afford to eat balanced meals."				
	Never true	Often, sometimes true		
	55.6%	44.4%		
Excellent, Good				

52.0%

There was no significant association between general mental health status and could not afford to eat balance meals in the last 12 months (p > .05).

48.0%

Average, Poor

As Shown in Table 9, association between general mental health and ever cut the size of your meals or skip meals because there was not enough money for food.

Table 9. Association between general mental health and ever cut the size of your meals			
Mental health status	In the last 12 months, did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?		
	Never true	Often, sometimes true	
Excellent, Good	69.4%	30.6%	
Average, Poor	62.0%	38.0%	

There was no significant association between general mental health status and ever cut the size of your meals or skip meals because there was not enough money for food during the last 12 months (p > .05).

As Shown in Table 10, association between general mental health and how often did this happen within the last 12 months.

Table 10. Association between general mental health and how often did this happen			
Mental health status	How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?		
Excellent, Good	Almost, Some, but not every month 72.7%	Only 1 or 2 months 27.3%	
Average, Poor	72.2%	27.8%	

There was no significant association between general mental status and how often did this happen during the last 12 months (p > .05).

As Shown in Table 11, association between general mental health and did you ever eat less than you felt you should because there was not enough money for food in the last 12 months.

Table 11. Association between general mental health and did you ever eat less			
Mental health status	In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?		
	No Yes		
Excellent, Good	74.3%	25.7%	
Average, Poor	73.5%	26.5%	

There was no significant association between general mental health status and ever eating less than you felt you should because there was not enough money for food during the last 12 months (p > .05).

As Shown in Table 12, association between general mental health and were you every hungry but did not eat because there was not enough money for food.

Table 12. Association between general mental health and were you every hungry			
Mental health status	In the last 12 months, were you every hungry but didn't		
	eat because there wasn't enough money for food?		
	No Yes		
	80.6%	19.4%	
Excellent, Good			
Average, Poor	78.0%	22.0%	

There was no significant association between general mental health status and were you every hungry but did not eat because there was not enough money for food during the last 12 months (p > .05).

Is there a significant association between general physical health status and each of the above food insecurity variables?

As Shown in Table 13, association between general physical health and the food bought just did not last and did not have money to get more in the last 12 months.

Table 13. Association between general physical health and the food bought just did not last

Physical health status	"The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more."	
	Never true Often, sometimes true	
Excellent, Good	53.3%	46.7%
Average, Poor, very poor	56.9%	43.1%

There was no significant association between general physical health status and bought just did not last and did not have money to get more during the last 12 months (p > .05).

As Shown in Table 14, association between general physical health and could not afford to eat balanced meals in the last 12 months.

Table 14. Association b	etween general physical health and could not afford to
eat balanced meals	

Physical health status	"(I/we) couldn't afford to eat balanced meals."	
	Never true	Often, sometimes true
	48.9%	51.1%
Excellent, Good		
Average, Poor, very poor	56.9%	43.1%

There was no significant association between general physical health status and could not afford to eat balance meals in the last 12 months (p > .05).

As Shown in Table 15, association between general physical health and in the last 12 months did you ever cut the size of your meals or skip meals because there was not enough money for food.

Table 15. Association between general physical health and ever cut the size of your meals			
Physical health status	In the last 12 months, did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?		
	Never true	Often, sometimes true	
Excellent, Good	64.4%	35.6%	
Average, Poor, very poor	68.6%	31.4%	

There was no significant association between general physical health status and ever cut the size of your meals or skip meals because there was not enough money for food in the last 12 months (p > .05).

As Shown in Table 16, association between general physical health and how often did this happen in the last 12 months.

Table 16. Association between general physical health and how did this happen			
Physical health status	How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?		
Excellent, Good	Almost, Some, but not every month 87.5%	Only 1 or 2 months 12.5%	
Average, Poor, very poor	60.0%	40.0%	

There was no significant association between general physical health status and did not last in the 12 months (p > .05).

As Shown in Table 17, association between general physical health and did you ever eat less than you felt you should because there was not enough money for food.

Table 17. Association between general physical health and did you ever eat less than you felt			
Physical health status	In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?		
	No	Yes	
Excellent, Good	70.5%	29.5%	
Average, Poor, very poor	78.0%	22.0%	

There was no significant association between general physical health status and ever eating less than you felt you should because there was not enough money for food during the last 12 months (p > .05).

As Shown in Table 18, association between general physical health and in the last 12 months were you every hungry but did not eat because there was not enough money for food.

Table 18. Association between general physical health and were you everyhungry			
Physical health status	Physical health status In the last 12 months, were you every hungry but didn't		
	eat because there wasn't enough money for food?		
	No Yes		
	73.3%	26.7%	
Excellent, Good			
Average, Poor, very poor	86.3%	13.7%	

There was no significant association between general physical health status and being very hungry but did not eat because there was not enough money for food that did not last 12 months (p > .05).

CHAPTER FOUR:

DISCUSSION

The purpose of this study was to evaluate how food insecurity among college students has impacted students in different circumstances. Some aspects that contributed to food insecurity among college students were financial income status, cost of tuition, transportation, and fulfilling their basic needs. By using a cross-sectional study method, the major findings that were reported determined that food insecurity among students is a factor that has affected student general mental and physical health status. Students could not afford to buy food or prepare meals because they did not have financial stable income to purchase more nutrition within the last 12 months due to prioritizing other necessities.

In the study population, using cross-sectional study method about 56.1% reported never true, 9.2 % reported often true, and 34.7% reported sometimes true that the food they bought just didn't last, and they didn't have money to get more in the last 12 months. Tuition hardship attend to be cause of the reason why college students cannot afford to eat a three times proper meal each day, which may be associated with paying college tuition fees, textbook cost, housing, or rent (Phillips et al., 2018). By covering the cost of other essential needs college students attend to overlook turn nutrition health and attend to prioritize education and other financial needs rather than eating a proper meal for each day. Participants reported that they do not have money to afford food in the last

12 months for proper meal often or sometimes, associated with food insecurity among college students from financial burdens.

College student reported that about 54.1% stated never true, 15.3% reported often true, and 30.6% reported, that it was sometimes true that they couldn't afford to eat balanced meals in the last 12 months. Financial burden attends to be factor involved in a college student life that limits their nutrition needs and cuts their meals in half or must skip a meal to afford other basic needs to survive within the last 12 months. Financial hardship as to daily transportation, basic hygiene items, clothing, and health care are some important factors that intervene between a student to afford a balanced meal throughout the day. Which may negatively affect their academic performance by not getting the proper nutrition intake they need during this point of time. College students should get some awareness of knowledge provided on their campuses that can help provide them with some basic needs as to food pantry which is a food assistance resources on college campus that students can utilize for free with no cost. Other resources that students can access to see if they qualify is the government program as to Supplement Nutrition Assistant Program (SNAP), also known as the food stamp program were federal government helps provide food purchasing assistance for low to no income people. College students also can access this program to see if they qualify for SNAP, which may help them with affording a proper meal (Pedrelli et al., 2015; Ratcliffe et al., 2011).

In the study, 67.3% reported that it was never true, whereas 9.2% reported that it was often true, and 23.5% reported that it was sometimes true that in the last 12 months they or any other adults in their household had ever cut the size of their meals or skip meals because there wasn't enough money for food. In the last 12 months about 32.7% of people reported often true or sometimes true that they had to cut the size of their meals or skip meals because they did not have enough money for food. Due to financial crisis as to housing, rent, bills, transportation, medical expensive, unemployment and other basic needs that must be fulfilled to have a roof over their head. COVID-19 is another which has impacted these households' adults to cut or skip their meals because they do not have stable income to afford a meal. Households that are dealing with food insecurity can access government resources as to Supplement Nutrition Assistance Program (SNAP), which may help assist with food, and provide educational resources for low-income or no-income households (Ratcliffe et al., 2011).

In the study population 32.7% reported that almost every month, only in 1 or 2 months, some months but not every month had they ever cut the size of their meals or skip meals because there wasn't enough money for food in the last 12 months. Participants that reported that they had to cut or skip a meal because they did not have enough money for food, had mental and physical health problems that leading to food insecurity challenges they had to face. Mental health challenges college students and other adults attend to face are being

stress, anxiety, and depression due to emotional responses that are associated with difficulty sleeping, feeling fatigue, poor nutrition diet, financial and educational stress (VanKim & Nelson, 2013). Which limits the students and other adults to focus on other elements in their life does not focus on their health by skipping meals or cutting meals in between months in the last 12 months. This also affects their physical health because they are not getting the proper nutrition that they body needs that affects their academic performance, physical wellbeing, and emotional response system (Ramón-Arbués et al., 2020).

Study reported that, 72.4% no and 24.5% reported yes, that in the last 12 months, did they ever eat less than they felt they should because there wasn't enough money for food. The sample study that stated yes, they ate less than they should because they did not have enough income to purchase food that could last them 12 months. Facing financial issues is an important barrier to these participants that could not afford proper meals due to other things that needed to be prioritize for them to manage their lifestyle. Some factors that rise food insecurity among these participants are financial status, employment barriers, personal reasons, housing, groceries, bill payments, and other factors that play a role in participants to eat less because they could not afford to eat a proper meal in the last 12 months (Pruitt, 2016).

In the study population 79.6% reported no and 19.4% reported yes that in the last 12 months, they were every hungry but didn't eat because there wasn't enough money for food. "Food insecurity refers to the inability to afford

nutritionally adequate and safe foods", for participants that reported yes to dealing with hungry due to not having enough money to buy food that could last them for 12 months (Seligman et al., 2010). College students and household members that are from low- income status are individuals and households that are continuously facing food insecurity complications, which leads them into starvation. Also, affects their health outcomes to being diagnosed with chronic health issues such as diabetes, high blood pressure, malnutrition, depression, stress, anxiety, and other diseases that may affect their overall health. Due to limited budget household members attend to reduce their food intakes and limit their nutrition choices so that they can at least last their budget through the 12-month period (*Elsevier Health Sciences*, 2017; Seligman et al., 2010).

Limitations

This study has some limitations when conducting the survey questions are susceptible to recall bias among college students' participants that were food insecure. The methods that were used to examine the study was cross-sectional studies which did not allow evaluation of cause-and-effect functioning limitations. Limited to questions on food insecurity associated was not significant when gathering all of data collected. The survey questions were combined with other questions which were not related to the study, and some questions were overviewing student physical and mental health status that standardized in evaluating the limitations. In conclusion to limitation this study was recall bias

research that was conducted among college students who were food insecure and could not afford to eat or purchase a proper nutrient meal in the last 12 months.

Strengths

Strengths of this study included details on food insecurity among college students and how physical and mental health status were an undergoing factor that were associated with it. Food insecurity was examined based on incentives lowered self- selection bias, with anonymous survey meaning less social desirability of bias. Cross-sectional study method was used to conduct data by using food insecurity with physical and mental health status which was bias to the research of the study. The result points to the importance of food insecurity with no significant association of socially desirable recall bias in the study survey among the college students. In conclusion to strength, this study was conducted with lower self-select bias among college students when examining food insecurity with responding general mental and physical health status.

Conclusion

In conclusion, food insecurity is major public health problem that affects people of all ages. As discussed above that food insecurity have been affecting individuals in numerous ways, influencing their health outcomes, and leading to the diagnosis of chronic health disorders during the COVID-19 pandemic. A

cross-sectional study was conducted to evaluate how food insecurity among college students had played major roles on student overall health, their academic performances, transportation, income status, and other needs of students that were more important than food insecure. Resources such as to Supplement Nutrition Assistance Program (SNAP), and food pantry on college campuses are some of the resources that college students can access. There was no significant association between the food insecurity and physical and mental health status by not eating healthy meals during the last 12 months during the pandemic.

APPENDIX A

INSTITUTIONAL REVIEW BOARD LETTER OF APPROVAL

CSUSB INSTITUTIONAL REVIEW BOARD

Protocol Change/Modification IRB-FY2022-146 Status: Approved

Prof. Monideepa Becerra CNS - Health Science California State University, San Bernardino 5500 University Parkway San Bernardino, California 92407

Dear Prof. Becerra:

The protocol change/modification to your application to use human subjects, titled "Student health needs assessment-Third round" has been reviewed and approved by the Chair of the Institutional Review Board (IRB). A change in your informed consent requires resubmission of your protocol as amended. Please ensure your CITI Human Subjects Training is kept up-to-date and current throughout the study. A lapse in your approval may result in your not being able to use the data collected during the lapse in your approval.

This approval notice does not replace any departmental or additional campus approvals which may be required including access to CSUSB campus facilities and affiliate campuses. Investigators should consider the changing COVID-19 circumstances based on current CDC, California Department of Public Health, and campus guidance and submit appropriate protocol modifications to the IRB as needed. CSUSB campus and affiliate health screenings should be completed for all campus human research related activities. Human research activities conducted at off-campus sites should follow CDC, California Department of Public Health, and local guidance. See CSUSB's <u>COVID-19 Prevention Plan</u> for more information regarding campus requirements.

You are required to notify the IRB of the following by submitting the appropriate form (modification, unanticipated/adverse event, renewal, study closure) through the online Cayuse IRB Submission System.

1. If you need to make any changes/modifications to your protocol submit a modification

form as the IRB must review all changes before implementing them in your study to ensure the degree of risk has not changed.

2. If any unanticipated adverse events are experienced by subjects during your research study or project.

3. If your study has not been completed submit a renewal to the IRB.

4. If you are no longer conducting the study or project submit a study closure.

You are required to keep copies of the informed consent forms and data for at least three years.

If you have any questions regarding the IRB decision, please contact Michael Gillespie, Research Compliance Officer. Mr. Gillespie can be reached by phone at (909) 537-7588, by fax at (909) 537-7028, or by email at mgillesp@csusb.edu. Please include your application approval number IRB-FY2022-146 in all correspondence.

Best of luck with your research.

Sincerely,

Nicole Dabbs

Nicole Dabbs, Ph.D, IRB Chair CSUSB Institutional Review Board

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