FOOD INSECURITY PREVALENCE AMONG COLLEGE STUDENTS
AT KENT STATE UNIVERSITY

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The purpose of this study is to measure the degree of food insecurity within the college student population at Kent State University. College students (n=298) were recruited online through Flashline on the Kent State University website. The questionnaire gathered demographics based on age, gender, class standing, living situation, and work. The second part of the questionnaire included the US Adult Food Security Survey Module (AFSSM), which is a subset of the U.S. Household Food Security Survey Module, obtained by the USDA’s Economic Research Survey (2013) web site, and was used to measure the prevalence and severity of food insecurity among households. The prevalence of food insecurity among college students surveyed was 49.7% (n=148) with 18% (n=54) having marginal food security (level 1), 25.2% (n=75) having low food security (level 2) and 7% (n=21) having very low food security (level 3). Crosstabulations were used to show the breakdown of demographics and food security. Chi Square was used to show significance. The data was compiled and analyzed using social sciences software (SPSS, version 13.0). There was not a significant difference between class status and level of food security. There was a significant relationship between living arrangement, living arrangement, living location and level of food insecurity with a (p < 0.001). Students show higher food insecurity living off campus. Food insecurity is a significant problem for one in every two students surveyed.
A need exists to increase food availability and accessibility in all areas of this community.
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CHAPTER I
INTRODUCTION

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for a healthy and active life (USDA, 2013; Hughes, Serebraynikova, Donaldson & Leverit, 2011). Food insecurity is a condition resulting from financial resource constraints, including geographical differences in the cost of food & housing (Chaparro, Zaghloul, Holck & Dobbs, 2009). Food insecurity also affects people in marginal circumstances who precarious finances create recurrent anxiety about having enough food to feed themselves and their family (Bitton & Roth, 2010).

Healthy People 2020 states an overarching goal to promote health and reduce chronic disease through the consumption of healthful diets and the achievement and maintenance of healthy body weights. The goal of promoting healthful diets and healthy weight encompasses increasing food security and eliminating hunger (USDA, 2013). In the United States, the prevalence of obesity and diabetes continue to increase and receive attention, whereas little attention is paid to the increase in food insecurity (Bitton & Roth, 2010).

There were an estimated 49 million people who lived in food insecure households (USDA, 2013). Twelve point four percent of those adults were found to have very low food insecurity (USDA, 2013). The prevalence of food insecurity was combined from 2011- 2012 to give an average of more reliable statistics at the state level. Ohio was found to be above the United States average, at 16.1% (USDA, 2013). Food deserts are
defined as urban neighborhood and rural towns without ready access to fresh, healthy and affordable food (USDA, 2013). The USDA (2010) determined the 20.55% of the population of Portage County, where Kent is located, has low access to the store putting residents at risk for food insecurity.

Findings suggest that for many low-income families, compromises in housing quality are concomitant with food insecurity along with transportation and lack of appliances (Kirkpatrick & Tarasuk, 2011; Hill, Moloney, Mize, Himelick & Guest, 2011). Households with less-equipped kitchen facilities and poor cooking skills also had an increased risk for food insecurity (Broughton, Janssen, Hertzman, Innis & Frankish, 2006).

While there is limited evidence on the extent, determinants or consequences of food insecurity in university population, there is considerable evidence from multiple studies that food insecurity or food insufficiency is associated with academic performance, social skills, weight gain, low GPA, behavioral problems and depression (Marato, 2013; Jyoti, Frongillo & Jones, 2005). On a household level, the presence of food insecurity suggests a high degree of vulnerability to a broad spectrum of consequences including poor health status, a lasting risk for depression predicted only in persistent food insecurity and an increase of chronic health conditions (Stuff, et al., 2004; Hanson & Olsen, 2010).

**Problem statement**
The relationship between food insecurity and college students is an issue that needs further attention due to the lack of literature and knowledge. Food insecurity may have a large impact on this population and face future consequences. More knowledge is needed to determine the status of food insecurity among the college student population.

College students are an overlooked population where food insecurity may exist. There are numerous federal assistance programs but they are not targeted to college students. This population is away from home for the first time and may not have experience cooking, food shopping or obtaining food. The typical college students’ budget is limited because of tuition, housing, food and other expenses. The cost of tuition, room and board at public four-year institutions for the 2009-2010 academic year was $12,804, representing an increase of 37% over the past decade (Hurst, Baranik, & Daniel. 2013). Some students may not have access to grocery stores, or an easily accessible food resource. Kent State University is located within a food desert where 51.9% of the population has low access to a supermarket or a large grocery store (USDA, 2013).

To date, only a few of research articles have measured food insecurity and the prevalence within the college student population. Chapparo, Zaghloul, Holck, and Dobbs (2009) conducted a study at the University of Hawaii to access the prevalence of food insecurity within college students. Twenty-one percent of students were food insecure while 24% were at risk for food insecurity. Another study was done at American University in Washington that found over 50% of students were food insecure. Hughes,
Serebryanikova, Donalson & Leveritt (2011) also found a risk for food insecurity in part attributed to inadequate income support. These statistics indicate the need to investigate the prevalence of food insecurity among college students nationwide.

Multiple studies indicate that food insecurity has negative impacts on academic outcomes among children and college students of various age groups (Marato, 2013; Jyoti, Frongillo & Jones, 2005). There is also little evidence suggesting how much of the college population is affected. Given the potential risks to college students, more studies of food insecurity are needed to gain a better understanding of the prevalence of food insecurity within the college population.

**Purpose Statement**

The purpose of this study is to measure the degree of food insecurity within the college student population at Kent State University.

**Hypothesis**

There will be a difference in/varying level of food insecurity in college students based on demographics including age, class, and housing.

**Definition of Terms**

- Food insecurity- “The access of all people at all times to enough food for an active, healthy life” (USDA, 2013)
- High food security (*old label=Food security*)- “no reported indications of food-access problems or limitations.” (USDA, 2013)
• Marginal food security *(old label=Food security)*- “one or two reported indications--typically of anxiety over food sufficiency or shortage of food in the house. Little or no indication of changes in diets or food intake.” (USDA, 2013)

• Low food security *(old label=Food insecurity without hunger)*- “reports of reduced quality, variety, or desirability of diet. Little or no indication of reduced food intake.” (USDA, 2013)

• Very low food security *(old label=Food insecurity with hunger)* - “Reports of multiple indications of disrupted eating patterns and reduced food intake.” (USDA, 2013)

• Class- Freshman, Sophomore, Junior, Senior and Graduate students.

• Housing- Referring to where a student lives (off-campus or on-campus), with whom (alone, with students, parents or significant other), and how they pay for their living situation.
CHAPTER II

REVIEW OF LITERATURE

Food Insecurity

Food insecurity affects people in marginal circumstances who precarious finances create recurrent anxiety about having enough food to feed themselves and their family. In the United States, the prevalence of obesity and diabetes continue to increase and receive attention, whereas little attention is paid to the increase in food insecurity (Bitton & Roth, 2010).

The term food insecurity was originally used to describe the instability of national food supplies within poor nations, and then expanded to include the food security of food situations within families (Alaimo, 2005). Food security is currently defined by the access of all people at all times to enough food for an active, healthy life (USDA, 2013). It can also be defined as limited or intermittent access to nutritionally adequate, safe and acceptable, foods access in socially acceptable ways (Holben, 2010). This definition of food insecurity is based on a worldwide consensus that hunger, or food restriction that elicits the sensations of hunger, is not the only socially meaningful characteristic of a lack of food resource (Alaimo, 2005; Holben, 2010).

High food security also known as food security is defined as “no reported indications of food-access problems or limitations” (USDA, 2013). Marginal food security is defined as “one or two reported indications typically of anxiety over food sufficiency or shortage
of food in the house as well as little or no indication of changes in diets or food intake” (USDA, 2013). Low food security, also known as food insecurity without hunger are defined as, “reports of reduced quality, variety, or desirability of diet as well as little or no indication of reduced food intake” (USDA, 2013). Very low food security also known as food insecurity with hunger is defined as, “reports of multiple indications of disrupted eating patterns and reduced food intake” (USDA, 2013).

Hunger is a potential consequence of food insecurity that, because of prolonged, involuntary lack of food, results in discomfort, illness, weakness, or pain that goes beyond the usual uneasy sensation. Elderly food insecurity appears to follow a progression of severity, beginning with compromised diet quality, followed by food anxiety, socially unacceptable meals, use of emergency food strategies, and finally actual hunger (Morton, Bitton, Oakland & Sand, 2005) Hunger and food insecurity have been identified as core indicators of an individual’s nutritional state (Kendall, Olson, Frongillo, 1995). The USDA (2006) developed an alternative label to convey the severity of food insecurity without using the word “hunger,” since hunger is difficult to measure. The new labels are now known as “low food security” and “very low food security” (USDA, 2006).

Within 2012, 17.6 million people were food insecure at some time during the year. These households were uncertain of having, or unable to acquire enough food to meet all members because they had insufficient money or other resources for food (USDA, 2013). Households that were found to have low food security were at 10.7 million (USDA,
These food insecure households obtained enough food to avoid substantially disrupting their eating patterns or reducing food intake by using a variety of coping strategies, such as eating less varied diets, participating in Federal food assistant programs, or getting food from emergency food pantries (USDA, 2013). Households that had very low food insecurity were measured to be at 7 million in 2012 (USDA, 2013). In these households, normal eating patterns of one or more household members were disrupted and food intake was reduced at times during the year because they have insufficient money or other resources for food (USDA, 2013). In conclusion, there were an estimated 49 million people who lived in food insecure households (USDA, 2013). Twelve point four of those adults were found to have very low food insecurity (USDA, 2013). The prevalence of food insecurity was combined from 2011-2012 to give an average of more reliable statistics at the state level. According to Feeding America the United States average food insecurity is about 16.4% (2014). Ohio was found to be above the United States average, at 17.8% (USDA, 2013). Portage County was found to be at 14.7%, slightly below the United States and Ohio food insecurity average (Feeding America, 2014).

The overarching goal of Healthy People 2020 (2010) is to attain high quality, longer lives, free of preventable diseases, disability, injury, or premature death; achieve health equity, eliminate disparities, and improve health of all groups; create social and physical environments that promote good health for all and; promote quality of life, healthy development, and healthy behaviors across all life stages. Food security is the key
to healthful living and must be achieved in the United States to improve the health of its people (Holben, 2010).

**Predictors of Food Insecurity**

The hunger and homeless survey (2007) defines the causes of food insecurity must be understood before it can be eradicated. Poverty, high housing and utility costs, unemployment, medical and health costs, mental health problems, lack of education, transportation costs, and substance abuse are cited as factors contributing to food insecurity in the United States from the hunger and homeless survey (2007).

Families among the market rental housing, have a significant association between food insecurity and the proportion of the income allotted to shelter (Kirkpatrick and Tarasuk, 2011). The odds of food insecurity are lower among subsidized families compared to only those market households on a waiting list for subsidized housing (Kirkpatrick & Tarasuk, 2011). No access to a refrigerator or oven did increase the risk of food insecurity compared to those who did have these amenities (Hill, Moloney, Mize, Himelick & Guest, 2011). Among market families, living in housing in need of major repair was associated with increased odds of food insecurity (Kirkpatrick & Tarasuk, 2011). Financial spending declined in the adequacy of food spending among low-income households as the share of income allocated to a housing increase (Kirkpatrick & Tarasuk, 2011). No regular transportation to buy food put individuals at an increased risk of food insecurity (Hill, Moloney, Mize, Himelick & Guest, 2011). Households with the least
access to food of reasonable quality have an increase of food insecurity as well (Broughton, Janssen, Hertzman, Innis & Frankish, 2006).

Findings suggest that for many low-income families, compromises in housing quality are concomitant with food insecurity along with transportation and lack of appliances (Kirkpatrick & Tarasuk, 2011; Hill, Moloney, Mize, Himelick & Guest, 2011). Households with less-equipped kitchen facilities and poor cooking skills also had an increased risk for food insecurity (Broughton, Janssen, Hertzman, Innis & Frankish, 2006). The income entering a household not only influences the resources available for food but also the financial burden of non-discretionary expenses (Kirkpatrick & Tarasuk, 2011).

**Food Desert**

Food deserts are defined as urban neighborhood and rural towns without ready access to fresh, healthy and affordable food (USDA, 2013). A community that is considered a food desert will meet low-income and low-access threshold. Low-income communities qualify if the poverty rate is 20% or higher (USDA, 2013). Low-access communities qualify if 33% of the population census lives more than one mile from a supermarket or a large grocery store (USDA, 2013).

These types of communities may not have access to supermarkets or grocery stores, instead they are served by fast-food restaurants and convenience stores that offer few healthy, and affordable options. In low-income urban neighborhoods, typically there are few full-service grocery stores. Convenience stores and small markets, offering
foods of lower quality with less nutritional value, are common for mothers and small children without access to a vehicle (Broughton, Janssen, Hertzman, Innis & Frankish, 2006).

Theories have been formulated to determine how food deserts form. One theory has been associated with both the development and closure of stores (Curtis & McClellan, 2005; Walker, Keane & Burke, 2010). It is believed that the growth of large chain supermarkets on the outskirts of inner-cities in more affluent areas offer consumers a better quality, variety and price for food options. These large chain grocery stores tend to have longer business hours and better parking options that are attractive to consumers (Guy, Clarke & Eyre, 2004; Walker, Keane & Burke, 2010). The expansion of supermarkets have forced smaller stores to close, creating areas where affordable varied food is accessible to those who have access to transportation (Guy, Clarke & Eyre, 2004).

Kent State University is located in Portage County. The USDA (2010) determined the 20.55% of the population of Portage County has low access to the store. About 51.9% of the population within Kent State University has low access to a supermarket or a large grocery store within a half mile radius (USDA, 2013).

**Food Assistance Programs**

The use of food stamps, soup kitchens, and food pantries increased sharply during 2009, with more than 37 million individuals enrolled in the Supplemental Nutrition Assistance Program, an increase of nearly 40% from 2007. The trend continued through the end of 2009. In June, 2010, participation in the Supplemental Nutrition Assistance
Program continued to increase to almost 42 million individuals, again reaching a new level high (Bitton & Roth, 2010).

Habib, Paula, Beatriz, Mayworm Guerra, Tavares, and Marta (2012) estimated the prevalence of food insecurity among families receiving municipal and federal welfare benefits, as well as examined its relationship with nutritional status of the population cover by the Vila Felipe Family Health Unit (FHU). The results showed that 78.3% of the households that were at some degree of food insecurity. The vast majority of the adult were well nourished, at all levels of food insecurity. A significant number of people were overweight and obese. Although this study was not conducted within the United States, this study revealed food insecurity within their federal assistance program. It is important to know the reality of those enrolled in public welfare to help define new policies dealing with problems such as poverty, malnutrition and hunger (Habib, et al., 2012).

Coping strategies used by households to avoid very low food security include eating less varied diets, participating in federal food and nutrition assistance programs, and obtaining emergency food from community food pantries, emergency kitchens, and shelters (Holden, 2010). Households receiving food from emergency food providers, including pantries, kitchens and shelters, appear to be particularly vulnerable to food insecurity (Holben, 2010). Rose (1999) stated that those who are food insufficient are much more likely to have experienced recent events that stress household budgets, such as losing a job, gaining a household member or losing food stamps.
The Supplemental Nutrition Assistance Program

The Supplemental Nutrition Assistance Program, SNAP, is the Nation’s largest domestic food and nutrition assistance for low-income Americans (USDA, 2013). Rank and Hirschl (2005) estimated the likelihood that Americans will use food assistance at some point during their adulthood. Between the ages of 20 and 65, slightly over half (50.8%) of all Americans will, at some point, receive food stamps. The use of the programs takes place over a relatively short period of time but typically reoccurs at several points in the life course.

To be eligible for SNAP households must meet certain tests, including resources and income tests. Households may have $2,000 in countable resources, such as a bank account, or $3,250 in countable resources if at least one person is age 60 or older, or is disabled. However, certain resources are not counted, such as home and lot. Households have to meet income tests unless all members are receiving Temporary Assistance for Needy Families, Social Security Income, or general assistance. Most households must meet both the gross and net income tests, but a household with an elderly person or a person who is receiving certain types of disability payments only has to meet the net income tests. For example, a household of one will be eligible for SNAP if their gross monthly income is $1,245 and their net monthly income is $958. Gross income is a household’s total, non-excluded income, before any deductions have been made. Net income means gross income minus allowable deductions (USDA, 2013). Generally participants between 18 and 50 who do not have any dependent children can get SNAP
benefits only for 3 months in a 36-month period if they do not work or participate in a workfare or employment and training program other than job search (USDA, 2013).

In the fiscal year 2012, about 1 in 4 Americans participated in at least 1 of the United States Department of Agriculture’s (USDA) 15 domestic food assistance programs. Seventy three percent of food assistance spending went to the Supplemental Nutrition Assistance Program, SNAP (USDA, 2013). During the past 25 years, participation rates in the Food Stamp Program have averaged between 7% and 10% of the total US population (Rank & Hirschl, 2005). Over the past 3 decades, the percentage of those eligible to participate averaged between 50% and 60% (Rank & Hirschl, 2005). Policy analysts have attempted to understand why some eligible households do not participate in the program. Research shows a preference among the nonelderly for the Food Stamp program over food pantries. Conversely, elderly households tend to use the food pantry system over the Food Stamp program (Daponte, 2000). Another focus of research is estimating the dynamics and determinants of food stamp use. Most periods of food stamps use are of a fairly short duration, although the likelihood of returning to the program is relatively high. Key factors leading to the use of food stamps include the individuals’ capital and economic circumstances and their household structure (Rank & Hirschl, 2005).

Women, Infants, and Children (WIC)

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) program is a public health program that provides federal grants to states for
supplemental foods, health care referrals, and nutrition education (Metallinos-Katsaras, Gorman, Wilde & Park, 2011) Eligible populations include low-income pregnant and postpartum women, infants and children up to are five who are found to be at nutritional risk (Metallinos-Katsaras, Gorman, Wilde & Park, 2011; USDA, 2013) Automatic income eligibility include certain applicants determined income-eligible based on their participation in certain programs which include; SNAP, Medicaid, Temporary Assistance for Needy Families and individuals that are eligible to participate in certain other State-administered programs (USDA, 2013)

“Nutritional risk” means that an individual has medical-based or dietary based conditions. Medical-based conditions include anemia, underweight, and history of poor pregnancy outcome. A dietary-based condition may include a poor diet (USDA, 2013). A large body of research has found that WIC participation during pregnancy contributed to better birth outcomes including birth weight, lower rates of premature deliveries and neonatal risk, as well as improved maternal health outcomes and even savings of federal expenditures through Medicaid (Metallinos-Katsaras, Gorman, Wilde & Park, 2011) WIC participants have higher rates of affirmative responses about food insufficiency and food running out (Metallinos-Katsaras, Gorman, Wilde & Park, 2011).

Emergency Food Assistance Programs

Despite the numerous federally funded food programs now funded, emergency feeding programs such as food banks and soup kitchens, religious and service institutes, food donations, and food drives, American families are not immune to hunger and
poverty (Alaimo, 2005). Emergency food assistance is an important component of the nutritional food safety net and often an alternative, rather than a supplement to SNAP (Bartfeld, 2003).

Households with limited resources employ a variety of methods to help meet their food needs. Some participate in one or more of the federal food assistance programs or obtain food from emergency food providers in their communities to supplement the food they purchase. Households that turn to community food assistance programs typically do so because they are having difficulty in meeting their food goals (USDA, 2013).

Food pantries and emergency kitchens are the main direct providers of emergency food assistance (USDA, 2005). The majority of them are affiliated with faith-based organizations. Food banks and food rescue organizations serve as the wholesalers in the private food assistance system, supplying food pantries and soup kitchens with low-cost food (Tiehen, 2002). The Emergency Food Assistance Program, TEFAP, supplements the food pantries and emergency kitchens that cannot get receive enough supplies from local resources. In 2005, TEFAP supplied 476 million pounds of commodities to community emergency food providers. Pantries and kitchens play different roles (USDA, 2005).

Food pantries distribute unprepared foods for offsite use. An estimated 32,737 pantries operated in 2000 and distributed an average of 239 million pounds of food per month. Households using food pantries received an average of 38.2 pounds of food per visit (USDA, 2005). Emergency kitchens or soup kitchens provide individuals with prepared food to eat at the site. Some 4 million households obtained emergency food
from food pantries one or more times during the 12-month period ending in December of 2005 (USDA, 2005).

The use of food pantries and emergency kitchens was strongly associated with food insecurity. Food-insecure households were 17 times as likely as food secure household to have obtained food from a food pantry and 19 times as likely as food-secure households to have eaten a meal at an emergency soup kitchen (USDA, 2005).

**Portage County Food Assistance**

Food and Non-financial assistance programs found within Portage County, Ohio include the Northeast Portage Food Shelf, Center of Hope, County Clothing Center, Kent Social Services, Portage County Salvation Army and more. The Northeast Portage Food Shelf is an agency that serves people who live in Windham/ Garretsville School Districts with food and other supplies to help them meet basic human needs and provide for their families. The Center of Hope tries to provide for the needs of the low to moderate income, and can give them food and personal care items. The center also provides holiday meals, aid, and programs for families through distribution of both Christmas and Thanksgiving food baskets. In addition, toy and gifts are also collected and provided for children. The County Clothing Center provides gently used clothing to individuals and families in Portage County for free to qualified people. The Kent Social Services is similar to some of the other programs and non-profits on this page, the non-profit agency provides nutritious hot meals, low cost groceries and food pantry assistance, Monday
through Friday, that help families in all areas of Portage County Ohio meet their basic needs for food and personal care and hygiene items.

The Akron-Canton Regional Foodbank provides food and other essential items to member agencies in eight Northeast Ohio Counties: Carroll, Holmes, Medina, Portage, Stark, Summit, Tuscarawas and Wayne. These member agencies operate more than 500 programs like food pantries, hot meal sites, shelters and other hunger-relief programs in the neighborhoods and communities where people need food. The agencies that use the Foodbank to serve hot meals are The Lord’s Pantry, Kent Social Services, Riverwood Community Chapel, Brimfield Community Cupboard, Salvation Army, and Upper Room Cultural Development Center.

The Salvation Army located in Ravenna, Ohio, is dedicated to serving the men, women and children who are at-risk and in need of financial, social service, and spiritual support. The Salvation Army strives to meet the basic needs of all who come seeking help. They are able to take immediate care of the basic human needs of food, shelter, clothing and safety. It is also noted that at no time the participation in spiritual activities be required as a condition for receiving needed services.

The Campus Kitchen is a national organization that provides healthy meals to those in need by harnessing the spirit of student volunteerism within local communities. The national Campus Kitchens organization has engaged students for 12 years and supports kitchens at 33 colleges and high school campuses. There is a Campus Kitchen located at Kent State University and prepares weekly meals for more than 250 individuals.
in need who are serviced by Kent Social Services, Center of Hope and Springtime of Hope. This program reaches out to the community through various ways. For example, Campus Kitchen sets up at the Farmers’ Market to cook, market their program and establish relationships with farmers, food recovery and nutrition programs. They also work with Nutrition Outreach which does nutritional analysis of menus, Bridge Program which distribute nutritious bagged meals to those in need, PG & J Sandwich Creation that creates sandwiches and snacks for the homeless as well as the Might Pack Program which assembles weekend meals for the youth (Kent State, 2013).

**Consequences and Risks of Food Insecurity**

Negative nutrition and non-related nutrition problems have been associated with food insecurity in children, adolescence, and adults including substandard academic achievement, inadequate of key nutrients, poor health, increased risk for and development of chronic diseases, poor disease management, and poor psychological and cognitive functioning (Holben, 2010).

Food insecurity is most likely to be overlooked in overweight and obese individuals. In the United States, as in many other countries, excess weight is more prevalent in individuals at the lower end of the socioeconomic continuum. Adolescence who experience food insecurity are more likely to intend to gain weight but engage in less physical activity than food- secure subjects with the same BMI (Gulliford, Nunes, & Rocke, 2006). Food insecure individuals are more likely than food secure subjects to
report that most of their free time was spent doing things that involved little physical effort (Gulliford, Nunes, & Rocke, 2006).

In a longitudinal study for children, persistent household food insecurity without hunger was associated with 22% greater odds of childhood obesity (Metallinos-Katsaras, Must & Gorman, 2012). For adults, research continues to support that food insecurity is associated with overweight and obesity (Holben, 2010). Possible causes of this phenomenon include a binge-like eating pattern or overeating when food is available and consumption of low-quality diets of empty-energy, high-fat, and sugary foods (Holben, 2010).

Obesity contributes to the finding that more poor than rich individuals develop diabetes, with onset typically at an early age (Bitton & Roth, 2010). Well-planned diets are a cornerstone of glycemia control but are difficult to maintain when finances are highly constrained. Cardiovascular diseases follow a similar scenario (Bitton & Roth, 2010). Seligman, Davis, Schillinger, and Wolf (2010) assessed whether food insecurity was associated with multiple indicators of diabetes self-management among 40 low-income adults with diabetes. Food–insecure participants reported poorer adherence to blood glucose monitoring and more hypoglycemia-related emergency department visits. They determined that food insecurity is a barrier to diabetes self-management and a risk factor for clinically significant hypoglycemia (Seligman, Davis, Schillinger & Wolf, 2010).
A longitudinal study identified factors predictive of discontinuous and persistent food insecurity over three years among low-income families with children in rural counties in 13 U.S. states (Hanson & Olsen, 2012). Respondents reported substantial knowledge of food and finance skills, community resources and public food assistance, yet 24% persisted in food insecurity. Another 41% were food insecure for one or two years. Participants with chronic health conditions increased the risk of both discontinuous and persistent food insecurity. Less is known about persistent food insecurity that is food insecurity that occurs year after year (Hanson & Olsen, 2012).

Among adults, food insecurity/insufficiency is associated with poor mental health status, as well as depression (Holben, 2012). Lengthy risk for depression was significantly related to persistent food insecurity. Compared with respondents having no years at risk for depression, respondents with two years of depression risk were four times as likely to have persistent food insecurity as to have no food insecurity and more than three times as likely to have persistent than discontinuous food insecurity. (Hanson & Olsen, 2012)

Stress is positively associated with the intake of calorically dense, high-fat food (Kelly, Mazzeo & Bean, 2013). Pan, Sherry, Njai, and Blanck (2012) examined the association between food stress and obesity. Among the 12 states they included in their study, obesity was 27.1%, food secure adults were 25.2%, and food insecure adults were at 35.1%. Food insecure adults had a 32% increased odds of being obese compared to food secure adults (Pant, Sherry, Njai & Blanck, 2012). Food insecure adults had a
significantly higher prevalence of obesity within the following subgroups: adults about the age of 30 years, women, non-Hispanic whites, non-Hispanic black, adults with some college education or a college degree, a household income of <$25,000 or $50,000 to $74,999, and adults with non or two children in their households (Pant, Sherry, Njai & Blanck, 2012). One in three food insecure adults were obese (Pant, Sherry, Njai & Blanck, 2012).

A study to investigate the associations between food insecurity, social demographics, and health factors and dietary intakes among adults residing in disadvantaged urban areas found 25% of participants to be food insecure (Ramsey, Giskes, Turell & Gallegos, 2012). Food insecurity was associated with lower household income, poorer general health, increased health care utilization, and depression. Food security may result in significant health burdens among the population, and this may be concentrated in socio-economically disadvantaged suburbs (Ramsey, Giskes, Turrell & Gallego, 2012).

Results from multiple studies indicate that food insecurity may have a negative impact on academic outcomes among children of various age groups (Chapparo, Zaghloul, Holck, & Dobbs, (2009). Jyoti, Frongillo, and Jones (2005) associated food insecurity with academic performance, weight gain and social skills. Food insecurity was predictive of poor development trajectory in children. Children begin to experience the effect of food insecurity even at the most marginal level of household food deprivation.
Children in households with any signs of food insecurity score lower and learn less during the school year (Winicki & Jemison, 2003).

**College Students**

**Nutrition**

College students are a diverse yet distinct population with specific health risks and needs. College students’ eating habits are concerning because poor nutritional intake is associated with a number of negative health outcomes, including weight gain, chronic diseases, and increased health care costs (Kelly, Mazzeo & Bean, 2013). The transition to college represents a critical time period for dietary habits and can pose significant challenges to healthy eating (Kelly, Mazzeo & Bean, 2013). Some students have difficulty with the responsibilities of purchasing and preparing their own meals and managing new eating schedules. Additional social and environmental factors, including limited access to healthy food and limited peer support for eating well, may negatively influence students’ dietary habits (Kelly, Mazzeo & Bean, 2013). Most college students are not meeting dietary and physical activity guidelines (Haug, et al., 2003).

The National College Health Assessment or the NCHA (2013) is a nationally recognized research survey that assists in collecting precise data about students’ health habits, behaviors and perceptions. In the spring of 2013, this survey estimated that 58.7% of students eat 1-2 servings of fruits and vegetables per day. Pelletier and Laska (2013) examined the association between college students dietary patterns and the frequency of purchasing food/beverages from campus are venues, purchasing fast food, and bringing
food from home. Approximately 45% of students surveyed purchased food/beverages from at least one campus venue three times per week. Frequent food/beverage purchasing around campus was associated with less frequent breakfast consumption and higher fat and added sugar intake, similar to fast-food purchasing. While bringing food from home was associated with healthier dietary patterns (Pelletier & Laska, 2013).

The average college student consumes 1 serving of fruit, 1.5 servings of vegetable, 0.5 serving of low-fat dairy, and 1.4 servings of whole grains daily (Kelly, Mazzeo & Bean, 2013; Dehdari, Kharghani, Mansouri & Saki, 2013). Haug, Harris, Lee, Nazir, Born and Kaur (2003) reported college students have <20 g of fiber per day and reported physical activity on fewer than 3 days per week. Given these factors, it is not surprising that the typical college student’s diet is high in fat, sugar, and sodium and lacking in valuable nutrients.

Increasing evidence indicates that energy-dense, high in fat, sugar and starch, tends to be lower in micronutrients and of lower costs compared to nutrient-dense diets (Broughton, Janssen, Hertzman, Innis & Frankish, 2006). Increased consumption of energy-dense diets high in fat, particularly saturated fat, and low in unrefined carbohydrate and combined with a decline in energy expenditure is associated with a sedentary lifestyle (Who, 2003). Because of these changes in dietary and lifestyle patterns chronic conditions such as obesity, diabetes mellitus, cardiovascular disease, hypertension and stroke and some types of cancer, are becoming increasingly significant causes of disability and premature death (Who, 2003).
College Students Lifestyle

The American College of Sports Medicine and the American Heart Association recommend moderate-intensity cardio or aerobic exercise for at least 30 minutes on 5 or more days per week or vigorous-intensity cardio or aerobic exercise for at least 20 minutes on 3 or more days per week. The NCHA (2013) reported about 56.6% of college students do moderate-intensity cardio or aerobic exercise for at least 30 minutes 1-4 days a week.

About 48.8% of students met the recommendation for moderate-intensity exercise, vigorous-intensity exercise, or a combination of the two (2 moderate-intensity exercise periods = 1 vigorous-intensity exercise period). Females were less likely to meet vigorous physical activity recommendation in college and more likely to report poor mental health and perceived stress (Vankim & Nelson, 2013). Socializing was significantly associated with meeting vigorous physical activity recommendations in college. Students who reported low socializing had lower odds of meeting vigorous physical activity. Low socializing was associated with higher odds of poor mental health and higher odds of perceived stress among males and females (Vankim & Nelson, 2013). Research has shown a substantial decrease in physical activity during the transition from adolescence into adulthood (Vankim & Nelson, 2013).

The transition from adolescence into young adulthood represents a unique developmental period that can have a significant effect on the adaptation and maintenance of health behaviors (Vankim & Nelson, 2013). About 61% of college
students have a healthy weight body mass index (BMI) between 18.5- 24.9 and about 21.9% of students are overweight or have a BMI within 25-29.9 (NCHA, 2013).

**Mental Health Status of College Students**

Stressor-strain theory suggests that exposure to stressors can negatively impact individuals’ health resulting in behavioral, physical or psychological strains (Hurst, Baranik & Daniel, 2013). College can be a period of increased risk for poor mental health and depression (Vankim & Nelson, 2013). Stressors traditionally found in college, such as academic pressure, are more complex as student are faced with more financial stressor and may have to work additional jobs to supplement their income. The frequency and the severity of mental health problems reported by students are increasing as well as the advancements in technology and the changing landscape of the typical college classroom (Hurst, Baranik & Daniel, 2013).

According to the NCHA (2013), students answered questions about their mental health that they have experienced within the last 12 months. About 45% of students “felt things were hopeless,” 83.7% reported “feeling overwhelmed by all you had to do,” 79.1% “felt exhausted not from physical activity,” 55.9% “felt very lonely,” 50.6% “felt very sad,” and 51% “felt overwhelming anxiety” (NCHA, 2013). Forty- four point seven percent of college students considered academics hard to handle and about 41.7% reported more than average stress (NCHA, 2013).
College Students and Food Insecurity

Approximately a third of young adults (ages 18-24 years) in the United States attend college, representing a critical mass of the young adult population (Vankim & Nelson, 2013). Food-insecure, yet healthy adults often make nutritionally poor choices about the food they consume and overeat in anticipation of later food shortfalls, predisposing them to obesity (Bitton & Roth, 2010).

Chapparo, Zaghloul, Holck, and Dobbs (2009) assessed the prevalence and identified possible predictors of food insecurity among college student at the University of Hawaii at Manoa. They found that 21% of students surveyed were food-insecure, while 24% were at risk of food insecurity. Students at high risk of food insecurity included those who reported living on campus and those living off-campus with roommates. They determined that food insecurity is a significant problem among college students at the University of Hawaii at Manoa and concluded that future studies should assess the prevalence of food insecurity in other college campuses (Chapparo, Zaghloul, Holck, & Dobbs, 2009).

Marato (2013) investigated the prevalence of food insecurity among community college students and the relationship between food insecurity and student Grade Point Average. Over 50% of the students in the overall sample were food insecure. Food insecurity affected 59% of students at the urban community college and 53% of students at the suburban community college. Food insecurity was significantly associated with lower student GPA in the overall sample and at the suburban community college but not
at the urban college (Marato, 2013). Their data suggested that food insecurity may be an issue for a large percentage of the community college population, regardless of the income or surrounding area (Marato, 2013).
CHAPTER III

METHODOLOGY

Introduction

The purpose of this study is to measure the degree of food insecurity within the college student population at Kent State University. The independent variables include; male, female, off campus, on campus, full-time student, and freshman through graduate status. The dependant variable is food insecurity.

Participants

Participants will be college students at Kent State University. The sample size was 299 participants. Inclusion criteria of participants include between ages of 18-26, graduate or undergraduate student, living on or off campus and full-time/ part-time student at Kent State University. Exclusion criteria include students under the age of eighteen, over the age of 27, married students and students who have children. The reason to exclude children from the survey is because it improves comparability between households with and without children in different age ranges and avoids asking questions about children’s food security, which can be sensitive in some survey contexts. Marriage is excluded for the purpose of the spouse being able to support the potential participant. Participants were recruited by a personal announcement posted on Flashline that gave a link to the survey via convenience sampling.
**Instrument**

Demographics questionnaire was the first part of the survey. Demographics consisted of thirteen questions, which collected data about age, gender, class, living arrangement, work, and payment of the students living arrangement. The US Adult Food Security Survey Module (AFSSM), which is a subset of the U.S. Household Food Security Survey Module, obtained by the USDA’s Economic Research Survey (2013) web site, was used to measure the prevalence and severity of food insecurity among households. The AFSSM is available online and free to the public. The AFSSM consists of ten questions; each question addressed condition and behaviors that may have occurred in the previous 12 months and that attempt to characterize households with difficulty meeting basic food needs. The questions specify lack of money or other resources to obtain food as a reason. The food security scale is the classification of food insecurity, which is based on the number of questions and is expressed by numerical values ranging from 0-10. The AFSSM results were summarized into the four food security categories (High food security, marginal food security, low food security and very low food security). The scores are as follows; a raw score of zero is food security, a raw score between one and two is marginal food security, a raw score between three and five is low food security and a raw score between six and ten is very low food security. This survey has been proven to be valid and reliable for measuring food insecurity and hunger for population and individual uses (USDA, 2013).
Procedure

An application was submitted through IRB and passed in February. A communication request form was filled out to post a personal announcement on Flashline. A demographics questionnaire was developed to go with the AFSSM survey. The survey was be entered in Qualtrics. The first set of questions included in the demographics was to go over the exclusion criteria before the AFSSM begins. The survey was posted on Flashline for three weeks, where a link was provided to access the survey on-line. The survey was monitored, so that issues could be prevented. Results were contained in Qualtrics and results were compiled through Excel and SPSS.

Statistical Data

Descriptive statistics was used to summarize the prevalence of food insecurity and the characteristics of the sample. Food insecurity was measured on the survey on a scale of 1-10. Each answer that indicates a risk of food insecurity was scored with one point. A total of zero represents food security. Differences between food security score, based on demographics, was analyzed using Chi square tests with a significance of $p < 0.05$. Crosstabulations examined the breakdown of levels between demographics and level of food security. The Chi-square was used to determine the percentages of food security within the four categories. Each set of demographics was compared to the level of food insecurity using the Chi-square test. Data was analyzed by the Statistical Package for Social Science (SPSS inc., Chicago, IL, USA) and Excel.
CHAPTER IV

JOURNAL ARTICLE

Introduction

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for a healthy and active life (USDA, 2013; Hughes, Serebraynikova, Donaldson & Leverit, 2011). Food insecurity is a condition resulting from financial resource constraints, including geographical differences in the cost of food & housing (Chaparro, Zaghloul, Holck & Dobbs, 2009). Food insecurity also affects people in marginal circumstances whose precarious finances create recurrent anxiety about having enough food to feed themselves and their family (Bitton & Roth, 2010).

*Healthy People 2020* states an overarching goal to promote health and reduce chronic disease through the consumption of healthful diets and the achievement and maintenance of healthy body weights. The goal of promoting healthful diets and healthy weight encompasses increasing food security and eliminating hunger (USDA, 2013). In the United States, the prevalence of obesity and diabetes continue to increase and receive attention, whereas little attention is paid to the increase in food insecurity (Bitton & Roth, 2010).

There were an estimated 49 million people who lived in food insecure households in 2010 (USDA, 2012). Twelve point four percent of those adults were found to have
very low food insecurity (USDA, 2013). The prevalence of food insecurity was combined from 2011-2012 to give an average of more reliable statistics at the state level. Ohio was found to be above the United States average, at 16.1% (USDA, 2013). Food deserts are defined as urban neighborhood and rural towns without ready access to fresh, healthy and affordable food (USDA, 2013). The USDA (2010) determined the 20.55% of the population of Portage County, where a large state university is located, has low access to the store putting residents at risk for food insecurity.

Findings suggest that for many low-income families, compromises in housing quality are concomitant with food insecurity along with transportation and lack of appliances (Kirkpatrick & Tarasuk, 2011; Hill, Moloney, Mize, Himelick & Guest, 2011). Households with less-equipped kitchen facilities and poor cooking skills also had an increased risk for food insecurity (Broughton, Janssen, Hertzman, Innis & Frankish, 2006).

While there is limited evidence on the extent, determinants or consequences of food insecurity in university population, there is considerable evidence from multiple studies that food insecurity or food insufficiency is associated with academic performance, social skills, weight gain, low GPA, behavioral problems and depression (Marato, 2013; Jyoti, Frongillo & Jones, 2005). On a household level, the presence of food insecurity suggests a high degree of vulnerability to a broad spectrum of consequences including poor health status, a lasting risk for depression predicted only in persistent food insecurity and an increase of chronic health conditions (Stuff, et al., 2004;
Hanson & Olsen, 2010). The purpose of this study is to measure the degree of food insecurity within the college student population at Kent State University.

Methodology

The investigation was a post-test only, quantitative, non-experimental, comparative and descriptive survey study. The Institutional Review Board at Kent State University approved this study.

Participant Criteria

The participants for this research included, at least eighteen of years of age, graduate or undergraduate student, living on or off campus and full-time/part-time student at Kent State University. Exclusion criteria include students under the age of eighteen, married students and students who have children. The reason to exclude children from the survey is because it improves comparability between households with and without children in different age ranges and avoids asking questions about children’s food security, which can be sensitive in some survey contexts. Marriage is excluded for the purpose of the spouse being able to support the potential participant.

Survey Development

An online survey was utilized in this study. It consisted of two parts. Part I was a demographics questionnaire that collected information on age, gender, race, class status, hours of work, living arrangement and situation. The US Adult Food Security Survey
Module (AFSSM) which is a subset of the U.S. Household Food Security Survey Module. It was used to measure the prevalence and severity of food insecurity among households. The AFSSM consists of ten questions; each question addressed condition and behaviors that may have occurred in the previous 12 months and that attempt to characterize households with difficulty meeting basic food needs. The questions specify lack of money or other resources to obtain food as a reason. The food security scale is the classification of food insecurity, which is based on the number of questions and is expressed by numerical values ranging from 0-10. The AFSSM results were summarized into the four food security categories (High food security, marginal food security, low food security and very low food security). The scores are categorized as: a raw score of zero is classified as food security, a raw score between one and two is considered marginal food security, a raw score between three and five is identified as low food security and a raw score between six and ten is classified as very low food security. This survey has been proven to be valid and reliable for measuring food insecurity and hunger for population and individual uses (USDA, 2013).

**Data Collection**

Data was collected from February to March 2014 utilizing an electronic survey engine, Qualtrics. Subjects were recruited through the University’s homepage by a personal announcement that included a link. The survey was available for three weeks.
All completed surveys were kept confidential within the survey engine, Qualtrics. All participants viewed a consent form before proceeding with the survey.

**Statistical Analysis**

Statistical analysis was conducted using SPSS 13.0 and Excel. The independent variables include; male, female, off campus, on campus, full-time student, and freshman through graduate status. The dependant variable is food insecurity. Crosstabulations were used to examine the breakdown of food security levels. Variable were tested with the Chi-Square test to determine if a significance, or a relationship existed with a $p < 0.05$.

**Results**

Four hundred and twenty two individuals completed the survey but one hundred and twenty three were excluded from the survey due to exclusion criteria (i.e.: students under the age of eighteen, over the age of 27, married students and students who have children). Therefore, two hundred and ninety eight individuals were included in the study.

The prevalence of food insecurity among college students surveyed was 49.7% ($n=148$) with 18% ($n=54$) having marginal food security (level 1), 25.2% ($n=75$) having low food security (level 2) and 7% ($n=21$) having very low food security (level 3).

*Table 1* shows the breakdown of levels between Class Statuses relationship between class and level of food security. Crosstabulations were used to examine the
There was not a significant difference between class status and level of food security. Regardless of class standing, it seems to be fairly evenly distributed, without one cell having an extremely large or small number of participants with a $p > 0.01$. Table 2 indicates the results below.

Table 1

*Frequency Distribution between Class and Food Security*

<table>
<thead>
<tr>
<th>Class Standing</th>
<th>Food Security (n=298)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Food Secure</td>
<td>Marginal Food Secure</td>
</tr>
<tr>
<td>Freshman</td>
<td>12% (36)</td>
<td>(9)</td>
</tr>
<tr>
<td>Sophomore</td>
<td>12% (36)</td>
<td>(11)</td>
</tr>
<tr>
<td>Junior</td>
<td>8% (24)</td>
<td>(16)</td>
</tr>
<tr>
<td>Senior</td>
<td>10% (30)</td>
<td>(10)</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>7% (22)</td>
<td>(8)</td>
</tr>
<tr>
<td>Total</td>
<td>49.7% (148)</td>
<td>(54)</td>
</tr>
</tbody>
</table>

*No significant relationship in level of food security based on class standing (p=0.235)*

The relationship between living arrangement and level of food security is provided in Table 2. Crosstabulations examined the breakdown of levels between living arrangements. The Chi-square test determined there was a significant relationship between living arrangement and level of food insecurity with a $p < 0.001$. Students who pay for
rent demonstrated higher food insecurity rates. Students who did not have to pay for their own rent, had a lower risk of food insecurity. These results are shown below in Table 2.

Table 2

Frequency Distribution between Living Arrangement and Level of Food Security in College Students

<table>
<thead>
<tr>
<th>Living Arrangement</th>
<th>Food Security</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 298)</td>
<td></td>
</tr>
<tr>
<td>I pay rent for my housing</td>
<td>Food Secure 13% (40)</td>
<td>39% (116)</td>
</tr>
<tr>
<td></td>
<td>Marginal Food Secure 29</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low Food Security 38</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very Low Food Security 9</td>
<td></td>
</tr>
<tr>
<td>I own my home</td>
<td>1% (2)</td>
<td>2% (7)</td>
</tr>
<tr>
<td>My parents or guardians pay for my rent</td>
<td>13% (39)</td>
<td>23% (69)</td>
</tr>
<tr>
<td></td>
<td>(11)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(14)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(5)</td>
<td></td>
</tr>
<tr>
<td>I live in housing where I do not pay rent</td>
<td>22% (67)</td>
<td>36% (106)</td>
</tr>
<tr>
<td></td>
<td>(15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(17)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(7)</td>
<td></td>
</tr>
<tr>
<td>Total:</td>
<td>50% (148)</td>
<td>100% (298)</td>
</tr>
<tr>
<td></td>
<td>(55)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(74)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(21)</td>
<td></td>
</tr>
</tbody>
</table>

* Significant relationship between living arrangement and level of food insecurity (p< 0.001)

Crosstabulations examined the breakdown of levels between living situations. A significant relationship between living situation and level of food security exists. The cells are unevenly distributed and there are disproportionate amounts of Low Food
Security and Food Security for “I live alone,” and “I live with parents”. Students who live alone or with other students show a higher rate of food insecurity. Students living at home have a lower rate of food insecurity. Table 3 shows the results below.

Table 3

*Frequency Distribution between Living Situation and Level of Food Security in College Students*

<table>
<thead>
<tr>
<th>Living Situation</th>
<th>Food Security</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Food Secure</td>
<td>Marginal Food Secure</td>
</tr>
<tr>
<td></td>
<td>(n= 298)</td>
<td>(n= 298)</td>
</tr>
<tr>
<td>I live alone</td>
<td>6% (18)</td>
<td>(10)</td>
</tr>
<tr>
<td>I live with other students</td>
<td>21% (62)</td>
<td>(26)</td>
</tr>
<tr>
<td>I live with roommates who are not students</td>
<td>1% (3)</td>
<td>(1)</td>
</tr>
<tr>
<td>I live with parent(s), relative(s), or guardian(s)</td>
<td>19% (57)</td>
<td>(9)</td>
</tr>
<tr>
<td>I live with my domestic partner/ significant other</td>
<td>2% (7)</td>
<td>(9)</td>
</tr>
<tr>
<td>Total:</td>
<td>49% (147)</td>
<td>(55)</td>
</tr>
</tbody>
</table>
*There is a significant relationship between living situation and level of food security (p< 0.001)

Crosstabulations were used to examine the breakdown of levels between current living location. Significance was shown between living location and level of food insecurity. The cells are unevenly distributed and there are disproportionate amounts of Low Food Security and Food Secure for “off campus housing” and “living at home with family.” Students who live off campus indicated low food security, whereas students living at home indicated food security. The results are shown below in Table 4.

Table 4

*Frequency Distribution between Living Location and Level of Food Security in College Students*

<table>
<thead>
<tr>
<th>Living Location</th>
<th>Food Security</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n= 298)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Food Secure</td>
<td>Marginal</td>
</tr>
<tr>
<td>Residence hall</td>
<td>14% (42)</td>
<td>(10)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off-campus housing</td>
<td>16% (49)</td>
<td>(33)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fraternity/Sorority</td>
<td>0% (1)</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living at home with family</td>
<td>19% (56)</td>
<td>(10)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total:</td>
<td>50% (148)</td>
<td>(55)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
*There is a significant relationship between Living Location and Level of Food Insecurity (p < 0.001)

**Discussion**

About fifty percent of the college students surveyed were identified as experiencing reduced food security, confirming the hypothesis. There was a significant difference between living location/arrangement with a higher risk of food insecurity. Students who lived at home or did not have to pay rent were shown to have a lower risk of food insecurity. Regardless of class standing, age, gender, and number of hours working, food security seemed to affect students across the board and showed no significant difference.

The prevalence of food insecurity is higher than the average United States at 16.4%, Ohio at 17.8% and Portage county at 14.7% food insecurity rates (Feeding American, 2014). The results obtained from this study confirm previous studies findings with similar findings of a 50% food insecurity rate within the college population. Chapparo, Zaghloul, Holck, and Dobbs (2009) at the University of Hawaii at Manoa found that 21% of students surveyed were food-insecure, while 24% were at risk of food insecurity. They also found students at high risk of food insecurity included those who reported living on campus and those living off-campus with roommates, confirming similar results. Marato (2013) reported similar results of 50% of the students in their overall sample were found to be food insecure.
Living situation was significantly associated with food insecurity, suggesting students are not able to support themselves completely to lead an active, healthy life. The University also resides in a food desert, which may limit a student’s ability to access food. Student’s parents may be expected to pay for their child’s education and maintain their welfare. However, students are also eighteen years of age, deeming them legal adults who are able to take care of themselves. As new adults put into society college students should have a safety net to ensure their success and survival. Class standing between students and food security did not have a significant relationship. Regardless of age or class, all students within the University are affected by food insecurity and is an alarming result.

There are a number of agencies around the University to help people in need, however they are not promoted within the college population. Campus Kitchen is an organization located within the University that provides food for the community. College students are used within this organization to provide the volunteer assistance. The Supplemental Nutrition Assistance Program (SNAP) requirements are to be at least eighteen years of age, have a gross monthly income of $1,245, net monthly income of $958 and are required to work. Generally participants are able to get SNAP benefits only for three months if they do not work or participate in a workfare or employment and training program other than job search (USDA, 2013). Given these requirements, students may have a difficult time receiving benefits.
A suggestion might include that there could be a screening tool to indicate at-risk candidates and resources students are able to use. Campus Kitchen should develop a plan to help those on campus, as well as within their community, considering their proximity to the population. Having an agency located on campus may assist students who have limited access to transportation.

Data suggest that food insecurity may be an issue for a large percentage of the community college population. Considering living association is significantly associated to a college students food security level, it may reflect the need to make trade-offs between important basic needs, such as housing or medical bills, and purchasing nutritionally adequate food. Food insecurity may have adverse effects on student health and performance that should be further investigated. Students’ ability to complete their desired degree may be affected by food insecurity and the inability to live a healthy, active life. GPA may be associated with the degree of food insecurity and should be further investigated by future studies.

**Implications**

Data suggests that food insecurity may be an issue for a large percentage of the community college population, regardless of age or class standing. Food insecurity may have adverse affects on students’ health and academic performance. Universities, faculty and students should consider food security as a risk to the health and wellness of current and future students.

**Limitations**
While 422 surveys were completed, only 299 surveys were kept due to exclusion criteria that led to a small sample size. Additionally, one fourth of the students excluded from the survey may be at risk and should be investigated. Convenience sampling is also a limitation, as it may not represent an accurate sample proportion to the population. Those individuals who have a special interest in food may have been more likely to respond.

**Conclusion**

Food insecurity is a significant problem for one in every two students surveyed. A need exists to increase food availability and accessibility in all areas of this community. Future studies need to investigate the prevalence of food insecurity on other college campuses that would increase awareness and formulate effective strategies to reduce its prevalence. Additionally, future studies need to examine the impact of food insecurity on college students.
APPENDICES
APPENDIX A

DOCUMENTAL CONSENT
APPENDIX A

Documental Consent

Food Insecurity

Welcome to "Food Insecurity," a web-based experiment that examines some of the finer points of Food Insecurity. Before taking part in this study, please read the consent form below and click on the "I Agree" button at the bottom of the page if you understand the statements and freely consent to participate in the study.

Consent Form

This study involves a web-based experiment designed to understand the significance of food insecurity within the college population. The study is being conducted by Dr. Gordon and Amber Gorman of Kent State University, and it has been approved by the Kent State University Institutional Review Board. No deception is involved, and the study involves no more than minimal risk to participants (i.e., the level of risk encountered in daily life).

Participation in the study typically takes 10 minutes and is strictly anonymous. Participants begin by answering a series of questions about demographics. Once the participants clear the exclusion criteria, a series of questions regarding food insecurity will be asked.

All responses are treated as confidential, and in no case will responses from individual participants be identified. Rather, all data will be pooled and published in aggregate form only. Participants should be aware, however, that the experiment is not being run from a "secure" https server of the kind typically used to handle credit card transactions, so there is a small possibility that responses could be viewed by unauthorized third parties (e.g., computer hackers).

Many individuals find participation in this study enjoyable, and no adverse reactions have been reported thus far. Participation is voluntary, refusal to take part in the study involves no penalty or loss of benefits to which participants are otherwise entitled, and participants may withdraw from the study at any time without penalty or loss of benefits to which they are otherwise entitled.

If participants have further questions about this study or their rights, or if they wish to lodge a complaint or concern, they may contact the principal investigator Amber Gorman at 440-521-4304 or Dr. Gordon at 330-672-2248; or the Kent State University Institutional Review Board, at (330) 672-2704.
If you are 18 years of age or older, understand the statements above, and freely consent to participate in the study, click on the "I Agree" button to begin the experiment.

I Agree  I Do Not Agree
APPENDIX B

SURVEY

Instructions: Please answer the following questions.

1. Are you at least 18 years of age?
   a. Yes
   b. No

2. Are you 27 years of age or older?
   a. Yes
   b. No

3. Are you currently married?
   a. Yes
   b. No

4. Do you have children?
   a. Yes
   b. No

5. I am currently ___ of age. (Fill in blank)

6. Are you currently a student at Kent State University?
   a. Yes
      i. Part-time student
ii. Full-time student

b. No

7. Sex/Gender

a. Female
b. Male
c. Prefer not to respond

8. Race/Ethnicity

a. African American
b. Asian/Pacific Islander
c. Hispanic/Latino
d. Multiracial
e. Native American/American Indian
f. White
g. Not Listed
h. Prefer not to respond

9. Class status:

a. Freshman
b. Sophomore
c. Junior
d. Senior
e. Graduate Student
10. How many hours do you work for pay?
   a. 1-10 hours/week
   b. 11-20 hours/week
   c. 21-30 hours/week
   d. More than 30 hours/week

11. Which statement best describes your current living arrangement?
   a. I pay rent for my housing
   b. I own my home
   c. My parents or guardian pay for my rent.
   d. I living in housing where I do not pay rent

12. Which of the following are applicable to your living situation?
   a. I live alone
   b. I live with other students
   c. I live with roommates who are not students
   d. I live with parent(s), relative(s), or guardian(s)
   e. I live with my domestic partner/ significant other

13. Which describes where you currently live?
   a. Residence hall
   b. Off-campus housing
   c. Fraternity/ Sorority housing
   d. Living at home with family
14. Which of these statements best describes the food eaten in your household in the last 12 months:
   
   a. Enough of the kinds of food we want to eat
   b. Enough but not always the kinds of food we want
   c. Sometimes not enough to eat
   d. Often not enough to eat
   e. Don’t know or Refused

15. “(I/We) worried whether (my/our) food would run out before (I/we) got money to buy more.” Was that often true, sometimes true, or never true for (you/your household) in the last 12 months?
   
   a. Often true
   b. Sometimes true
   c. Never true
   d. Don’t know or Refused

16. “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?
a. Often true

b. Sometimes true

c. Never true

d. Don’t know or Refused

17. “(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?

a. Often true

b. Sometimes true

b. Never true

d. Don’t know or Refused

18. In the last 12 months, since last (name of current month), 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?

a. Yes

b. No (Participant will skip A)

c. Don’t know (Participant will skip A)
19. A. How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?

   a. Almost every month
   b. Some months but not every month
   c. Only 1 or 2 months
   d. Don’t know

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

   a. Yes
   b. No
   c. Don’t know

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

   a. Yes
b. No

c. Don’t know

22. In the last 12 months, did you lose weight because there wasn't enough money for food?

   a. Yes
   b. No
   c. Don’t know

23. In the last 12 months, did (you/you or other adults in your household) ever not eat for a whole day because there wasn't enough money for food?

   a. Yes
   b. No (Skip A)
   c. Don’t know (Skip A)

24. A [IF YES ABOVE, ASK] How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?
a. Almost every month
b. Some months but not every month
c. Only 1 or 2 months
d. Don’t know
REFERENCES

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HHSurvey2007/hhsurvey07


