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Mixed methods analysis of migrant farm workers' health outcomes and access to healthy food in Moultrie, Georgia, USA

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Mixed methods analysis of migrant farm workers' health outcomes and access to healthy food in Moultrie, Georgia, USA

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An abstract of
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Abstract

Mixed methods analysis of migrant farm workers' health outcomes and access to healthy food in Moultrie, Georgia, USA

By Charlotte Sibley

Background: While **f**arm work is consistently rated as one of the most dangerous jobs in the United States, there is little information available on the health risks of this occupation. Research examining connections between food insecurity, diet diversity, demographic variables, and adverse health outcomes among migrant farm workers is especially lacking.

Objective: This study identifies predictors of anemia, high blood glucose, hypertension, and overweight/obesity, quantifies the distribution of these health outcomes, and studies their associations with food insecurity and dietary diversity among a population of migrant farm workers. The study also explores the workers' perceptions of their health and access to healthy foods and key informants' insights on these issues.

Methods: Surveys (n=62) conducted with a subset of the migrant farm worker population investigated the prevalence of and risk factors for food insecurity and low dietary diversity, while clinical data from the larger group (n=385) provided information about health outcomes. Focus groups discussions (FGDs) with women in the farm worker community explored household prioritization of resources and food preferences, and key informant interviews provided further information about community resources.

Results: Of the 385 farm workers, 22.4% were hypertensive, 49.4% were anemic, 33.5% had high blood glucose and an additional 41.1% had elevated blood glucose, and 57.7% were overweight or obese**.** In the surveyed subset, 66.1% experienced food insecurity, and 61.3% had low/medium dietary diversity. Food insecurity was associated with a three-fold increase in the odds of having high blood glucose. Themes from the FGDs and key informant interviews indicated that farm workers viewed financial constraints, lack of cultural familiarity, and limited access to healthcare as the most important barriers to healthy living.

Discussion: The high prevalence of food insecurity and low dietary diversity, as well as the association of food insecurity with high blood glucose, mirrored the findings of previous research. The qualitative data from this study revealed that while there are some resources available to help migrant farm workers lead healthy lives, the workers often did not know about these services. The results of this study can be used to inform future health outreach efforts among migrant farm workers.

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Introduction

Introduction and rationale

Migrants from Mexico have traveled to the US to work in agriculture in constantly increasing numbers since the institution of the 1942 Bracero Accord. After the program ended in 1964, the US "simply shifted from a de jure policy of active labor recruitment to a de facto policy of passive labor acceptance, combining modest legal immigration with massive undocumented entry" (Durand, Massey, & Parrado, 1999) (p. 519). In 2003, it was estimated that 81% of farm workers were foreign-born, and 95% of those were from Mexico (Hansen & Donohoe, 2003). The Immigration Reform and Control Act of 1986, which was intended to halt undocumented migration from Mexico, granted legal status to many Mexicans living in the US and effectively disrupted the seasonal flows of migrant workers (Durand, et al., 1999). Specifically, in accordance with Ravenstein's stream-counterstream theory, the movement of newly-documented residents into non-agricultural jobs created openings for those without "papers" (Ravenstein, 1885).

The approximately 7 million undocumented Mexican migrants currently living in the US (a large proportion of whom work in agriculture) are not counted in estimates of the magnitude of the complex health issues affecting migrant farm workers (Terrazas, 2010). It is impossible to quantify the extent of these issues—due in large part to "the migratory lifestyle many lead, their undocumented status, underreporting by employers, and general lack of priority put on the needs of this semi-invisible population"—the fact that they exist is undeniable (Sologaistoa, 2011) (p. 4). In the Southeast (Alabama, Georgia,

Florida, and Mississippi), 56% of farm workers were identified as Mexican, and 50% were undocumented in the most recent National Agricultural Workers Survey.

The major health issues facing the current population of migrant farmworkers in the Southeast are hazards stemming from their living and working conditions and lack of access to health care. Both of these factors can contribute to risk for chronic diseases like diabetes and heart disease, which were ranked as the second and fourth most important farm worker health conditions, respectively, by the farm worker organizations that responded to the recently administered Southeast Migrant Health Questionnaire (Sologaistoa, 2011).

The problem

Broad PH implications. Farm workers in all parts of the US live and work in poor conditions; 61% of all individual farmworkers have incomes below federal poverty levels (Hansen & Donohoe, 2003). They must deal with a more complex host of health problems than the general populations due to "the physical demands of their jobs, pesticide exposure, poor access to health care services and poor living conditions" (Hoffman, 2010) (no page). One major problem associated with living in a migrant farm worker camp is that limited transportation and lack of access to cooking facilities contribute to food insecurity (Hill, Moloney, Mize, Himelick, & Guest, 2011). In addition, recent studies in farm worker populations in North Carolina and along the US/Mexico border have found associations between food insecurity and health outcomes like anemia (Quandt, Arcury, Early, Tapia, & Davis, 2004), cardiovascular disease, and diabetes (Weigel, Armijos, Hall, Ramirez, & Orozco, 2007).

In the Southeast, farm workers, 56% of whom are Mexican, have limited access to health care, which exacerbates the already heavy chronic disease burden and prevalence of food insecurity and low dietary diversity in this population (Sologaistoa, 2011). While foreign-born workers overall are much less likely to have health insurance than native-born Americans, Mexican immigrants appear to be the most disadvantaged—only one-third receive any health insurance from their employers, compared to two-thirds of people born in America (Waldinger & Reichl, 2006). This lack of insurance may influence decisions to seek preventive care. On the other hand, there are 400 federally authorized migrant health clinics, many of which have sliding-fee scales and are thus affordable for the uninsured. Unfortunately, these clinics only reach about 12 to 15% of the migrant farmworkers in the US (Hansen & Donohoe, 2003). One such migrant health clinic is the Ellenton Health Clinic in Colquitt County, Georgia, which serves some of the 60,826 statewide horticultural workers and their dependents, as well as other agricultural workers who do not work in plant crops and their dependents, living in southwest Georgia (Sologaistoa, 2011).

Knowledge gap

Because they are a transient, often undocumented population, scant data on diet, access to food, and health outcomes among migrant farm workers exist, as previously mentioned (Sologaistoa, 2011). There is limited research on how food insecurity is associated with health outcomes in this population. Some successful efforts to reach the huge numbers of farmworkers not covered by migrant clinics have been made, including the temporary clinics that operate each summer in southwest Georgia through the Farm Worker Family Health Program (FWFHP) (Hill, et al., 2011). However, in order to truly

overcome the barriers to accessing health care (which include not only the dearth of migrant clinics but also language and cultural hurdles) and the associated adverse health outcomes, more concentrated and larger-scale efforts are needed. In short, there is little information available on the connections between food insecurity, diet diversity, demographic variables, and health outcomes among migrant farm workers. As a result, it is difficult to identify risk factors for anemia, diabetes, hypertension, and overweight/obesity in this population. A recent study of farm workers served by an Emory affiliated farmworker program conducted by Physician's Assistants in Bainbridge, Georgia (modeled after the FWFHP) revealed that H-2A status is protective against food insecurity and identified several demographic characteristics associated with decreased access to healthy food, but the connections between health outcomes and food insecurity were not explored (Hill, et al., 2011). Thus, there is a serious need for more research that explores the connections between these health outcomes and food insecurity/dietary diversity and characterizes risks among migrant farm workers.

Purpose of this study

Given the existing knowledge gaps mentioned above, the main purpose of this study is to identify and examine predictors of anemia, high blood glucose, hypertension, and overweight/obesity, to quantify the distribution of these risk factors in the study population, and to study their associations with food insecurity and dietary diversity. An additional objective is to explore farm workers' own perceptions of their health and access to healthy foods and to gain insight on these topics by talking with key informants who have strong ties to the farm worker community.

Research questions

To accomplish the goals of this study, the PI uses a mixed methods cross-sectional design, to explore the following questions:

a. Among migrant farm workers, how do factors related to food insecurity and diet diversity influence chronic disease risk? More specifically, this study examines how anemia, high blood glucose, hypertension, and overweight/obesity are associated with food insecurity and diet diversity.
b. Additionally, this research qualitatively examines farm workers' perceptions of their access to healthy food. In particular, the study explores the opinions of both women living in the migrant farm worker community and key informants with close ties to farm workers in southwest Georgia regarding prioritization of household resources, food preferences and choices, access to healthy foods, and health outcomes.

Significance of this study

There were estimated to be more than 100,000 migrant and seasonal farm workers in the state of Georgia in 2001 (Georgia State University, 2001). Despite harvesting fresh fruits and vegetables for a living, this population experiences high rates of diet-related diseases such as hypertension, anemia, and diabetes (Emory School of Nursing, 2010). While these health outcomes have been consistently linked to food insecurity and low dietary diversity (Adams, Grummer-Strawn, & Chavez, 2003; Borre, Ertle, & Graff, 2010; Quandt, et al., 2004; Townsend, Peerson, Love, Achterberg, & Murphy, 2001;

Weigel, et al., 2007), "clear patterns of risk factors for food insecurity in migrant and seasonal farm workers have yet to emerge" (Hill, et al., 2011) (p. 831).

For two weeks each summer, a team from Emory's Nell Hodgson Woodruff School of Nursing travels to Moultrie, Georgia, to set up temporary health clinics for migrant families under the Farm Worker Family Health Program (FWFHP) in an attempt to prevent or diagnose and treat such conditions. Using the findings of this study, the range of diet-related services and interventions offered by migrant clinics like the Ellenton Clinic and outreach programs like the FWFHP could be expanded with the goal of further reducing preventable morbidity/mortality among farm workers in southwest Georgia. Specifically, this study's exploration of the risk factors for food insecurity and low diet diversity will add to the currently small knowledge base about the health status of migrant farm workers living in and near Moultrie, Georgia, and will facilitate the creation of healthcare initiatives targeted to their specific needs (e.g., diabetes management or obesity prevention education delivered through clinic outreach programs). Furthermore, providing information that can potentially be used to improve the health status of this vulnerable population will be a victory for social justice.

Definitions of terms

Agriculture. The Bureau of Primary Health Care (BPHC), which provides funding for the national migrant health program, defines agriculture as "farming in all of its branches including: cultivation and tilling of the soil; production, cultivation, growing, and harvesting of any commodity grown on, in or as adjunct to or part of a commodity grown in or on the land; any practice including: preparation and processing for market, packaging for delivery or storage, to market, to carriers for transportation to market"

(Sologaistoa, 2011) (p. 6). The definition excludes poultry, livestock, and fisheries. Additionally, many people, including the PI of this study, use the word “agriculture” to primarily refer to individuals who perform heavy manual labor working in horticulture, or plant crops.

Dietary diversity. Dietary diversity is the number of food groups or, less often, individual food items consumed over a certain time period, usually the previous day or week. Dietary diversity measured at the individual level reflects *quality* of the respondent’s diet, while household-level data provide a measure of *access* to food (Ruel, 2003).

Food security. In 1996, the World Food Summit declared that food security exists “when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life” (WHO, 2012) (no page). Food security has four main components: food availability (sufficient amount of food regularly available), food access (sufficient resources to procure nutritious food), food use (proper use of food and knowledge of appropriate nutrition), and stability of the three preceding components over time (WHO, 2012).

Migrant versus seasonal farm worker. A migrant farm worker is “an individual whose principal employment (51% or greater) is in agriculture, who has been so employed within the last 24 months, and establishes for the purposes of such employment a temporary abode” away from the place he/she calls home (Georgia State Office of Rural Health, 2008) (p.1). The definition of a seasonal farm worker is similar to that of a migrant farm worker, except that seasonal workers do not travel from job to job; rather, they live year-round in one location. Additionally, seasonal farm workers are only

employed in agriculture on a seasonal basis and do not earn a year-round income from farm work (Georgia State Office of Rural Health, 2008). The majority of workers included in this study are migrant farm workers.

Literature Review

Who are migrant farm workers?

In the decades following the end of the Bracero program and the passage of the Immigration Reform and Control Act of 1986, the "papers" separating documented from undocumented farm workers have often taken the form of a visa—such as the H-2A guestworker visa—permitting the individual to live and work in the US for a short period of time (e.g., several months). Under the terms of the H-2A program, the US attorney general can only grant visas to employers in the agriculture sector who certify that there are not enough US citizens who willing and able to fill the necessary positions and that employing non-citizens will not adversely affect the earnings and working conditions of US workers (Geffert, 2002).

While the H-2A guestworker program provides a number of benefits to farm workers, such as furnished housing and transportation to work and grocery stores, the program is far from perfect, and its regulations facilitate a catch-22 for workers seeking higher pay. As Geffert (2002) points out, the program "sets wages and work terms that, while stated as minimums, in practice are maximums" (Geffert, 2002) (p. 114), because anyone desiring a higher wage no longer qualifies as an available worker per H-2A guidelines. In addition, the workers may be ill-informed about their rights and/or reluctant to complain about poor pay and working conditions, and the Department of Labor does not have the resources to adequately investigate all complaints (Geffert, 2002). As a result, even farm workers who have H-2A visas often live and work under harsh conditions, are paid very little, and have poor health; those who are undocumented usually fare worse (Hill, et al., 2011).

Health concerns of migrant farm workers

Dangers of agricultural work. Farm work is consistently rated as one of the most dangerous jobs in the United States (Austin, 2002). In 2011, the Occupational Safety and Health Administration placed farmer/rancher at number four in its list of America's most dangerous occupations for the preceding year, between airplane pilot and mining machine operator. There were 41 fatalities per 100,000 farmers/ranchers in 2010, but it is likely that this number does not include all of the deaths among migrant and seasonal farm workers, the vast majority of whom are from Mexico, due to the large number of undocumented individuals in this group whose deaths might also go undocumented (Christie, 2011). It is estimated that 682 Latinos (more than 13 per week) died from work-related injuries in the US in 2010 (Occupational Safety and Health Administration, 2012). However, it is not known what proportion of these deaths occurred among Latino farm workers; this limitation coupled with the ambiguity inherent in OSHA's lumping of all agricultural workers together as "farmers/ranchers" makes it difficult to quantify precisely just how dangerous farm work is for migrant and seasonal workers. Nevertheless, it is clear that farm work is not just a *dangerous* job; it is a potentially *deadly* one.

Several major occupational hazards facing all farm workers include injuries (especially musculoskeletal), heat illness, and exposure to pesticides (Austin, 2002). In addition, farm workers are susceptible to communicable diseases spread in unsanitary conditions, and while many of the health problems that plague farm workers are also common in the general population, "the hardships of life as a farm worker result in unique challenges to the health of these workers and their families" (National Center for

Farmworker Health, 2002) (no page). For example, despite legislation dictating that farms must have clean water and bathroom facilities near the fields, OSHA found 69% of surveyed farms to be in violation of this ordinance (Austin, 2002). In addition, most farm workers are not covered by worker's compensation, so when work-related injury or illness occurs (e.g., infectious disease due to lack of bathroom facilities near the fields), workers often have no recourse against their employers (Austin, 2002).

Unique challenges for migrant/seasonal workers. The hardships associated with farm work are more pronounced for migrant and seasonal workers (versus farmers/ranchers who own their own farms and/or are US citizens), due to their marginalized status in the US and a rising anti-immigrant sentiment in many parts of the country. For example, the passage of Proposition 187 by voters in California in 1994 was an attempt to restrict access to healthcare to citizens only; even though the proposition was later declared unconstitutional, many undocumented workers still reported that the proposition made them feel apprehensive about seeking healthcare (Austin, 2002). The recent passage of House Bill 87 (HB 87), the "Illegal Immigration Reform and Enforcement Act of 2011" in Georgia allows law enforcement officials to question the immigration status of certain suspects via roadblock checkpoints and other means (Ramsey et al., 2011). There were estimated to be 425,000 undocumented immigrants—not all of them migrant workers—in Georgia in 2010, the seventh highest number for any state in the US. Between November 17, 2009, and December 6, 2011, 5044 undocumented immigrants were deported from Georgia, placing the state sixth in the nation for number of deportations during that time period (Redmon, 2012). Like California's Proposition 187, HB 87 has also created and will likely continue to create

fear and reluctance to seek healthcare among many farm workers in Georgia, in addition to discouraging migrant workers from coming to Georgia, resulting in decreased harvests due to lack of labor. Migrant health centers in Georgia have already reported that many migrants have left the state, frequently citing fear and lack of trust among their motivations for leaving (Sologaistoa, 2011).

In addition to approximately 30,000 H-2A workers, there are about 7 million undocumented Mexican migrants currently living in the US (a large proportion of whom work in agriculture) who are not counted in estimates of the magnitude of the complex health issues affecting migrant farm workers both on the job and at home (Terrazas, 2010). While it is impossible to quantify the extent of these issues for agricultural workers as a whole (due in large part to probable underreporting), the fact that they exist is undeniable. For instance, the average life expectancy for migrant farm workers (documented and undocumented) is 48 years, compared to the national average of 75 years (Hansen & Donohoe, 2003). The major health issues facing Mexican migrant farmworkers are chronic diseases, lack of access to primary and preventive healthcare, and hazards stemming from their living and working conditions.

Farm workers' limited access to healthcare is an important consequence of their poor living and working conditions. While foreign-born workers overall are much less likely to have health insurance than native-born Americans, Mexican immigrants appear to be the most disadvantaged—only one-third receive any health insurance from their employers, compared to two-thirds of those born in America (Waldinger & Reichl, 2006). This statistic is echoed in data from the most recent National Agricultural Workers Survey, which indicates that only 28% of farm workers have health insurance

(Sologaistoa, 2011). This lack of insurance may influence decisions to seek preventive care. On the other hand, there are 400 federally authorized migrant health clinics, many of which have sliding-fee scales and are thus affordable for the uninsured. Unfortunately, these clinics only reach about 12 to 15% of the migrant farmworkers in the US (Hansen & Donohoe, 2003).

The high burden of disease (i.e., anemia, diabetes, hypertension, overweight/obesity, etc.) caused by hazards at work and home and by lack of access to healthcare puts strain on both the workers and the health system. Obstacles to accessing basic health care mean that many farm workers do not seek care until the illness or injury can no longer be ignored, at which point emergency care may be necessary, placing an undue burden on the farm worker and the health system (Austin, 2002). For undocumented and/or uninsured workers, paying for the extreme costs associated with emergency room visits for common illnesses or injuries can be devastating to the worker and his/her family. Indeed, catastrophic spending on emergency or other unexpected health care can be a major contributor to food insecurity. Furthermore, many of the health problems for which farm workers seek emergency care could be prevented with regular medical visits (Austin, 2002).

Obesity and chronic diseases. The United States is in the midst of an obesity epidemic, and the United Nations recently held its second-ever high-level meeting on noncommunicable diseases (NCDs) in an effort to develop strategies to prevent and control the massive burden posed by NCDs, many of which claim obesity as a major contributing factor. According to CDC estimates, roughly two-thirds of adults in the US are overweight or obese, as are one-third of children. In most cases, obesity has a clear

cause: chronic energy imbalance. Simply put, regularly consuming more calories than one needs to maintain body functions results in weight gain.

It is perhaps ironic that migrant farm workers are especially prone to diet-related chronic diseases and obesity, because many of them participate in grueling physical activity for hours each day at work and eat little food. As part of Borre, et al.'s (2010) study, "One worker asked, 'Can you tell me why we are getting so fat? We work hard all day in the field, we are not eating more, and yet we are gaining weight!'" (Borre, et al., 2010) (p.451). This paradox may be explained, at least in part, by the nutrition transition, in which poorer populations bear the brunt of the chronic disease burden as energy-dense foods (i.e., foods rich in calories rather than nutrients) become cheaper. In the US, the excess calories that can lead to obesity are cheap and often most accessible to those who are most impoverished, like farm workers (Borre, et al., 2010). This observation makes sense in light of Drewnowski's finding (based on USDA Food and Nutrient Database for Dietary Studies and the Center for Nutrition Policy and Promotion food prices database) that grains and fats are the cheapest food groups per calorie, and fruits and vegetables are the most expensive (Drewnowski, 2010).

Borre, et al. (2010) extend their study of migrant farm workers' health to include the possible links between obesity and the inability to access health food due to financial constraints (as described by Drewnowski); such problems with access are part of a concept called food insecurity (Borre, et al., 2010). The association between food insecurity and increased risk of obesity has been established in the general population, for example, by Adams, et al. (2003), who found that obesity was more prevalent among food insecure women than those who were food secure (Adams, et al., 2003). The links

between food insecurity and obesity among migrant farm workers are less clear and require further elucidation through research.

Food insecurity

In 1996, the World Food Summit declared that food security exists "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life" (WHO, 2012) (no page). Food security has four main components: food availability (sufficient amount of food regularly available), food access (sufficient resources to procure nutritious food), food use (proper use of food and knowledge of appropriate nutrition), and stability of the three preceding components over time (WHO, 2012). Areas experiencing food insecurity are known as food deserts; the Healthy Food Financing Initiative, part of First Lady Michelle Obama's *Let's Move!* initiative, defines a food desert as a low-income census tract where a substantial number of residents cannot access a large supermarket or grocery store (USDA, 2012).

Many rural areas where agriculture is an important part of the economy (including parts of Colquitt and Brooks Counties in southwest Georgia, where data for this study were collected) are, paradoxically, food deserts (see Figure 1 below). In one census tract in Brooks County with 1675 total people, 59.7% had low access to healthy food, while 15.3% had low access and were low-income. Similarly, 30.5% of the 4339 people in a census tract in Colquitt County had low access, while 3.9% had low access and were low-income (USDA, 2012). Notably absent from these statistics are the undocumented workers who, by definition, cannot be counted in population estimates.

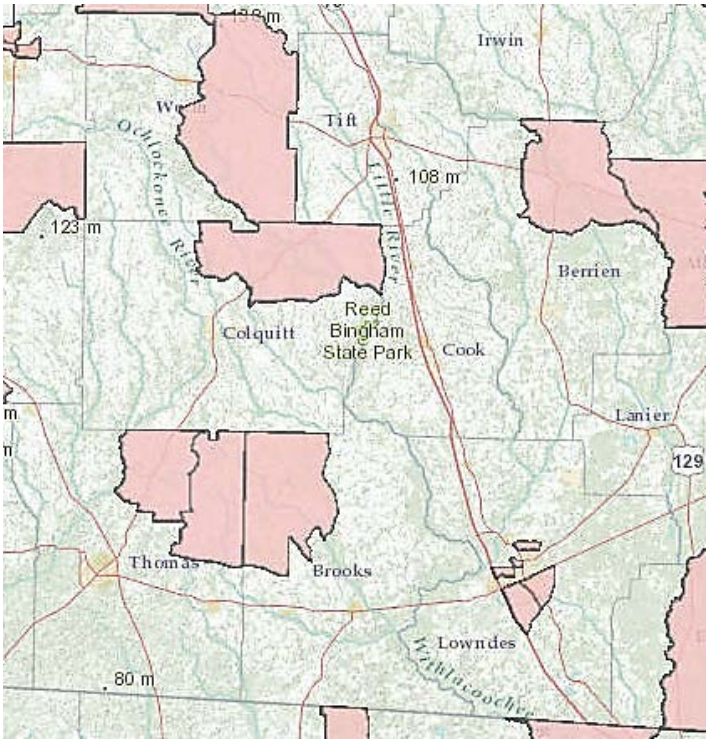

Figure 1: Food deserts (shaded areas) in southwest Georgia (USDA, 2012).

Causes of food insecurity/low diet diversity. There are several possible explanations for the stark discrepancies between the prevalence of food insecurity among farm workers and that of the general population. The first is that the poor conditions in which farm workers live and work make it difficult to access and buy healthy food. An estimated 61% of all individual farmworkers have incomes below federal poverty levels (Hansen & Donohoe, 2003). Two other major problems associated with living in a migrant farm camp are limited transportation and lack of access to cooking facilities, both of which have been found to contribute to food insecurity (Hill, et al., 2011).

In addition to the physical and financial obstacles that keep farm workers from accessing healthy foods, there may also be more subtle influences on food insecurity. Specifically, Borre, et al. (2010) and Geffert (2002) both postulate that the biggest barrier to obtaining healthy foods, surpassing inadequate housing and low wages, is the culture

that leaves migrant farm workers exposed to risks over which they have little control, and they depend on others who have both the opportunities and abilities to control the conditions under which they work and live. The risk of food insecurity for farm workers is thus embedded within the cultural lifestyle of migrant farm work as part of global agricultural production" (Borre, et al., 2010) (p. 455). In addition, many farm workers (i.e., those for whom a large proportion of their diets comes from local crops) must depend on the weather and the annual cycles of crops and are thus less able to access healthy foods during non-harvest months or during summer droughts. The grower by whom farm workers are employed often has control over their housing conditions and transportation. Therefore, the previously mentioned systemic barriers and issues of dependence and vulnerability are, in fact, intertwined.

Food insecurity and health outcomes among the general population. While the causal linkages are not as clear as those for, say, cigarettes and lung cancer, there are data that suggest that food insecurity is associated with chronic disease and other adverse health outcomes among migrant and seasonal farm workers; the same associations can also be found (and are a bit clearer) in the general population. For example, controlling for income, race/ethnicity, country of birth, general health status, and walking, obesity was found to be more prevalent in food insecure versus food secure women in the general population of California (31.0% compared to 16.2%); the same study found food insecurity with hunger to be associated with increased obesity risk for Asians, Blacks, and Hispanics (OR=2.81) but not non-Hispanic Whites (OR=0.82) (Adams, et al., 2003). These researchers hypothesize that the mechanisms by which food insecurity and obesity are associated involve limitations on the types of food available (e.g., low dietary

diversity) and the consumption of high energy, low cost foods. They further postulate that the link between food insecurity and obesity might be causal but acknowledge that more research needs to be done on this topic (Adams, et al., 2003).

A different study found that food insecurity was associated with overweight status among women (p-value<0.0001) but not among men (p-value=0.44), and this association held after adjustment for potential demographic and lifestyle confounders. However, whether this association holds in subsets of the population—like migrant farm workers—remains to be seen, as the authors acknowledge the obesity-food insecurity connection had not been adequately studied at the time of publication (Townsend, et al., 2001). Fitzgerald, et al. (2011) likewise noted that exploring the associations between food insecurity and chronic disease is a relatively new field of study. Their study found food insecurity to be an independent risk factor for type 2 diabetes (OR=3.33, 95% CI: 1.34,8.23) after controlling for SES characteristics, but the authors stressed the need for longitudinal studies to clarify this relationship (Fitzgerald, Hromi-Fiedler, Segura-Perez, & Perez-Escamilla, 2011). The results of the aforementioned studies indicate that, in general, food insecurity is associated with a number of adverse health outcomes while also stressing the need for more focused research.

Food insecurity and health outcomes among migrant farm workers. Quandt, et al. (2004) report that food insecurity is associated with poorer health—namely, more colds, anemia, and earaches among migrant and seasonal farm workers than among the general population in North Carolina. As for obesity, Borre, et al. (2010), classify its link to food insecurity as tenuous among migrant and seasonal farm workers. These authors were unable to establish an association between obesity and food insecurity due to small

sample size and high prevalence of obesity across food security strata. Nevertheless, they postulate that the link between food insecurity and obesity may be based in the working conditions, culture, and lifestyle of migrant farm workers (Borre, et al., 2010). According to Weigel, et al. (2007), food insecurity is associated with gastrointestinal infections, poor mental health, diabetes, and cardiovascular disease, but the links between food insecurity and obesity are unclear. Based on the lack of clear conclusions made by research to date, there is a pressing need to better understand the connections between food insecurity and obesity/chronic disease among migrant farm workers.

While the connections between adverse health outcomes, food insecurity, and diet diversity among migrant farm workers need to be elucidated by additional research, disparities between prevalence of food insecurity among farm workers and that of the general US population are well established. As observed by Quandt, et al. (2004), it is ironic that "while migrant and seasonal farm workers play an essential role in the production of most of the fruits and vegetables in the US, most have incomes that are low and precarious enough that they may be at risk for food insecurity" (Quandt, et al., 2004) (p. 569). These authors go on to report that food insecurity is about four times as prevalent among farm workers as among the general population in the US. Forty-seven percent of farm workers in Quandt, et al.'s (2004) North Carolina (NC) study reported some level of food insecurity, compared to 11.1% of the general population. Meanwhile, 63.8% of the households in the study of Borre, et al. (2010), also conducted in North Carolina, reported food insecurity. The findings of Weigel, et al. (2007) reveal an even greater prevalence (82%) of food insecurity among farm workers living along the US-

Mexico border. Most recently, Hill, et al. (2011) found that 62.8% of the farm workers they surveyed in southwest Georgia had experienced food insecurity.

Factors that protect migrant farm workers against food insecurity. Quandt, et al. (2004) found that parents' level of education (especially that of the mother) was significantly related to food insecurity in households with children, perhaps because it serves as a proxy for income and access to services. Furthermore, despite the shortcomings of the H-2A program (discussed above), possession of a guestworker visa appears to be beneficial: "the H-2A program, whether through job security; higher wages; access to cooking facilities, meals, and transportation; or some unknown factor, seems to protect against food insecurity issues" (Hill, et al., 2011) (p. 831).

Gaps in research

While previous studies on the associations between food insecurity and adverse health outcomes have provided substantial background information with which to frame the current project, there are notable gaps in the existing literature. In general, there is a lack of consistent knowledge about which specific demographic factors are associated with food insecurity; this study seeks to clarify such relationships among migrant farm workers in southwest Georgia. In addition, the research to date has not established a clear connection between overweight/obesity and food insecurity. One of the aims of this study is to establish the nature of this association and characterize potential confounders of this relationship, as well those between food insecurity, diet diversity, and three other health outcomes: anemia, high blood glucose, and hypertension.

Methodology

Introduction

The primary purpose of this cross-sectional mixed methods study was to explore the relationship between food insecurity, diet diversity, and health outcomes, including anemia, elevated/high blood glucose, hypertension, and overweight/obesity, among migrant farm workers in southwest Georgia. Data were collected using 1) surveys that gathered information on food security, diet diversity, and demographic characteristics; 2) clinical data from health check-ups; 3) focus group discussions (FGDs), and 4) key informant interviews. The PI administered all surveys, collected clinical data, and conducted interviews during the Farm Worker Family Health Program in June 2011. Each summer, the FWFHP "provides health care to migrant and seasonal farm workers and their families," (Wold, 2011) (p. 2). This care includes health screenings and episodic care for adult patients at nightly clinics held at farm worker camps and neighborhoods in southwest Georgia. In addition, the program conducts physical examinations for children at the elementary summer school program in Moultrie, GA. This analysis does not consider data collected on the children. In August 2011, FGDs were conducted with women at the Ellenton Clinic and in the yards outside the homes of participants.

Study site

Since 1993, the FWFHP has been an annual program held for two weeks each summer, organized by the Emory University School of Nursing in partnership with the Ellenton Clinic in Colquitt County, GA, Georgia Health District 8-2 and other healthcare programs at colleges and universities in Georgia. Throughout the year, the Ellenton Clinic—a federally funded farm worker clinic—serves farm worker families residing in

Cook, Tift, Brooks, and Colquitt Counties. The temporary clinics operated by the FWFHP, set up on location at an elementary school and at various farm worker camps in southwest Georgia, provide supplemental services for these families each year. In 2011, the FWFHP saw 182 children through the school program and 400 farm workers and their family members at the night clinics. While it is difficult to calculate exactly how many farm worker families live and work in the region served by the Ellenton Clinic and the FWFHP, a large number of farm workers and their family members are treated by the FWFHP each year (Wold, 2011). The PI choose the study site based primarily on the ease of partnering with the FWFHP, a decision that was strengthened by the substantial health burdens faced by the large farm worker population served by the program.

Research design

This study employed a cross-sectional mixed methods design consisting of both quantitative data collection in the form of surveys and clinical records and qualitative data collected through key informant interviews and FGDs. The PI employed this design to obtain a broad perspective on issues of food insecurity, diet diversity, and health outcomes in the farm worker community in southwest Georgia. For instance, the surveys provided a relatively quick way to gather information from a large number of (mostly male) participants during the fast-paced FWFHP night clinics. Analysis of the clinical data for all night clinic participants provided detailed, quantitative data on the health indicators of interest for men in the farm worker community and a limited number of migrant women who attended the night clinics. The FGDs were conducted with women and provided more detailed insights into attitudes about food and the home food environments of farm worker families. Women were selected for FGDs because women

make many of the decisions regarding food for families living in this community. Previous research has established women as the gatekeepers of food decisions in many migrant farm worker households (Kilanowski, 2010).

Population and sample

The primary participants in this study were migrant/seasonal farm workers (and their family members) living in southwest Georgia at the time of the study. Clinical and survey data came from adult (male and female) attendees of the FWFHP outreach night clinics and the Ellenton Clinic, while focus group discussion (FGD) participants were adult females. Key informants with close ties to the farm worker community were interviewed to provide context for the FGDs and survey data. (See Table 1 below.)

Table 1: Population and sample for each of four data collection methods

Method	*Population of Interest*	*Study Sample*	*Inclusion Criteria*	*Final Sample Size*
Clinical data	Migrant/seasonal farm workers in southwest GA	Workers (and their family members) who lived on or near farms where FWFHP clinics were set up	Only those who were 18 years old or older were included in this study (385 of the original 400)	Of the 400 workers attending FWFHP clinics, 385 met inclusion criteria and had their data included
Surveys	400 farm workers/family members who visited the FWFHP nigh clinics	Adults attending the final FWFHP station (foot care) at each night clinic or the Ellenton Clinic waiting room	Survey participants were 18 years or older and spoke Spanish or English (those who only spoke an indigenous dialect were excluded)	57 adults from FWFHP foot station and 5 from Ellenton clinic waiting room
Key informant interviews	Southwest GA residents who worked with farm workers	Healthcare workers and volunteers from community organizations that serve farmworkers	Interviewees were available and willing to participate (several potential interviewees were excluded due to scheduling conflicts)	2 healthcare workers and 2 volunteers from a community organization that provides foods to the farmworker community
FGDs	Women from the farm worker community in southwest GA	Women who were either patients of the Ellenton Clinic or were acquainted with the outreach workers	Adult women (>=18 y) who spoke Spanish or English and were available on the day FGDs were conducted	24 women included in 3 FGDs

Sampling and recruitment

Survey participants. Survey participants were recruited from the 385 adults meeting inclusion criteria for clinical data (Table 1) and included participants from the night clinics hosted by the FWFHP or the waiting room of the Ellenton Clinic (which has a long-standing relationship with the farm worker community in southwest Georgia). The five participants from the Ellenton Clinic waiting room were randomly selected (i.e., the PI recruited every other person who entered the waiting room).

Random sampling was originally proposed as the sampling strategy for the FWFHP participants; however the fast-paced nature of the clinics and the limitations of having only one survey administrator (the PI) required a modified strategy. As such, survey participants from the FWFHP were recruited using convenience sampling at the foot care station at the night clinics. All adults (18 years old or older) who completed the health checks and the foot care clinic and who spoke Spanish or English were eligible to participate—those who only spoke an indigenous dialect were excluded.

Key informants. The PI interviewed three key informants whose personal and professional ties to the farm worker community in southwest Georgia allowed them to offer insights into health and food issues prevalent in this population. The PI chose to interview these informants based on their connections to the local community and their availability. Key informant 1 (KI-1) and key informant 3 (KI-3) both worked at a local healthcare facility, which serves farm workers and their families. The combined contributions of two individuals who both worked at a local charitable organization,

which provides services to the migrant community, were designated as key informant 2 (KI-2).

Focus group discussion participants. The women in the focus groups were patients of the Ellenton Clinic and/or were acquainted with the clinic's full-time outreach workers. All FGD participants were adult women who spoke English or Spanish and were available to participate. The outreach workers served as gatekeepers and recruited 24 women from the farm worker community via telephone and word of mouth to participate in the FGDs (10 in the first, 4 in the second, and 10 in the third).

Instruments and procedures

Survey. The survey administered during the FWFHP and in the clinic waiting room was divided into three sections designed to assess the following topics: (1) background information and demographics, (2) food insecurity, and (3) diet diversity. The PI authored the demographics section in Spanish (and commissioned a back-translation to English to ensure proper understanding of the Spanish version), but the food insecurity and diet diversity components were adapted from widely used, validated instruments. Food security was assessed using a Spanish-language version of the 18-item USDA Food Security Module (Harrison, Stormer, Herman, & Winham, 2003). Field-testing of Harrison, et al's (2003) Spanish-language food security questionnaire previously revealed that respondents preferred this version to a free-translation of the English version of the tool, because they found its language to be more familiar. Diet diversity was assessed using the Food and Agriculture Organization (2007) diet diversity questionnaire. Because no Spanish version of the FAO diet diversity questionnaire (FAO Nutrition and Consumer Protection Division, 2007) was available, the PI translated the

English version to Spanish and had it back-translated to ensure proper understanding (See Appendix C). Administration of the survey is described below.

At the nightly FWFHP clinics, students and instructors from the Emory University School of Nursing and other colleges and universities in Georgia collected and recorded clinical data for the 400 attending patients using standard procedures. Briefly, upon arriving at the FWFHP clinic, individuals first checked in, then proceeded to visit health check stations of their choosing (e.g., blood pressure, blood glucose, and hemoglobin screenings, dental exams, physical therapy check-ups, and nurse practitioner consultations). The farm workers and their families visited any combination of these stations before proceeding to the exit station to turn in their charts and receive "goodie bags." FWFHP volunteers encouraged the patients to take advantage of the foot care station before leaving. The foot care station was set up in a convenient location (immediately adjacent to the exit station) each night, so all participants had to pass this station before submitting their charts and receiving "goodie bags" at the exit station. Upon arrival at the foot care station patients were recruited to participate in the demographic, food security, and diet diversity survey. After giving informed consent, survey participants provided the PI the following items from their clinic charts: gender, age, height, weight, BMI, blood pressure, hemoglobin, and blood glucose. The PI copied these data from each participant's chart onto his/her survey. The interviewer then administered the demographic, food security, and diet diversity survey. For all parts of the survey, the PI read the questions aloud in the language of the participant's choosing and recorded his/her answers.

At the Ellenton Clinic, the PI approached every other person who sat down in the waiting room and solicited his/her participation in the survey; five people completed the survey in the waiting room. The day on which the PI administered the surveys in the waiting room was a relatively busy one (and the clinic operates on a "no appointments" policy), so participants had ample time to complete the survey while waiting to be seen by the clinic staff. Because the PI administered the surveys before these participants completed their clinic visits, they did not yet have their clinical data available. The PI assigned an identification number to each waiting room survey participant, and a clinic staff member provided the de-identified clinical data to the PI at the end of the day, after all survey participants had completed their clinic visits. After giving informed consent (with added emphasis on the understanding that the PI would later obtain participant's de-identified clinical data from a clinic staff member), the interviewer administered the demographic, food security, and diet diversity survey. For all parts of the survey, the PI read the questions aloud in the language of the participant's choosing and recorded his/her answers.

Key informant interviews and FGDs. For each key informant interview, the PI developed a list of questions and follow-up probes to guide the conversation. For the FGDs, the PI wrote a more formal guide using the techniques of Hennink, et al (2011) and the Ten-Seed Technique (Jayakaran, 2002). In particular, the guide followed a funnel structure, starting with broad opening questions, then moving to more specific content questions, and concluding with broad closing questions (Hennink, Hutter, & Bailey, 2011). The first part of the FGD guide was an introduction that explained the guidelines for the discussion and asked participants' permission to record the conversation. The next

section consisted of group introductions and icebreakers. The women discussed three major topics: women's priorities for allocating household money, community perceptions on definitions of and access to healthy foods, and food/nutrition services available/desired in the community. As part of the discussion on allocating money, the women participated in a Ten-Seed activity, in which they were given ten pennies each and divided them according to how much household money would be spent on different resources each month (Jayakaran, 2002). The last section of the FGD guide asked participants for final comments or questions and thanked them for participating (See Appendix D). Administration of the interviews and FGDs is described below.

For the first key informant interview, the PI discussed farm worker health concerns in southwest Georgia and services provided by the Ellenton Clinic. The PI discussed similar issues during the second key informant interview, which took place during a "farm tour" with other students and instructors from the FWFHP team. For the third key informant interview, the PI discussed food availability and food bank demand/usage in southwest Georgia with volunteers at a charitable organization. The PI recorded all three key informant interviews using an Olympus VN-8100PC digital audio recorder and then transcribed them verbatim.

The three FGDs were conducted by a moderator, an outreach worker from the Ellenton Clinic, while the PI took notes and lasted between 30 and 35 minutes. The discussions focused on household priorities and spending habits, definitions of and access to healthy food, and food and nutrition services available/desired in the community. For each FGD, the PI first welcomed the participants and introduced the guidelines for the FGD. After the participants provided informed consent, the discussion began with a Ten-

Seed Technique exercise to capture how women prioritize monthly income to different expenses and food. Following the Ten-Seed activity, discussion focused on the knowledge, attitudes, and practices of the community regarding healthy eating and issues of access to healthy food and food/nutrition services in the farm worker community in southwest Georgia.

Outreach workers assisted with the FGDs, which were conducted with 24 women. The PI served light refreshments during the FGDs, and each participant received a ten-dollar Wal-Mart gift card as compensation for her time. The PI recorded the FGDs using an Olympus VN-8100PC digital audio recorder after all participants consented to participate and to have the discussion recorded.

Ethics/protection of human subjects

The PI submitted the research protocol and instruments to the Emory IRB, the director of Georgia Health District 8, Unit 2 (of which the Ellenton Clinic is a part), and the director of the Ellenton Clinic; all three entities approved the study. All participants provided informed verbal consent prior to participation. Because some participants were undocumented migrant workers, Emory IRB and GA Health District 8, Unit 2 granted permission to obtain verbal, rather than written informed consent for all parts of the study. The researcher read the informed consent document to the subject in the language of his/her choosing, obtained verbal consent, and gave the subject a copy of the informed consent document to keep. The clinical records did not have protected health information (PHI) associated with them, and the PI assigned identification numbers to the participants for the sole purpose of linking their clinical data to their answers to the survey questions. The director of the FWFHP and the Director of Research for the Nell Hodgson Woodruff

School of Nursing at Emory University both granted permission to access and use the clinical data. The gift cards given to FGD participants were purchased and distributed in accordance with the standards of the Emory IRB.

Data analysis

Survey and health data. Prior to performing statistical analyses, the PI translated the food security and diet diversity survey data (i.e., the key predictors) into standardized scores using criteria established by the authors of the individual data collection tools (Bickel, Nord, Price, Hamilton, & Cook, 2000; FAO Nutrition and Consumer Protection Division, 2007). For each question in the USDA food security module, the PI coded the participant's response as "affirmative" (1) or "negative" (0). Some of the questions had only "yes" or "no" as answer choices, and coding was thus straightforward. For other questions, the USDA criteria dictated that the PI code responses of "often" or "sometimes" as "affirmative" and "never" as "negative." Likewise, for follow-up questions about frequency whose answer choices were "almost every month," "some months," or "only one or two months," the PI coded the first two choices as "affirmative" and the third choice as "negative." For all questions, if the participant did not answer because he was screened out or because there was a built-in skip pattern, the PI coded the response as "negative." The scoring criteria dictated an exception to this rule for questions about children; if the participant did not have children, his responses for questions about children were coded as "missing," not "negative." Finally, for any question for which the participant either did not provide a response or answered, "I don't know," the PI coded the response as "missing."

Participants who had children received a final food security score out of 18 total points, while the PI calculated the scores of those without children out of 10 total points. According to the USDA scoring criteria, the PI designated participants (with or without children) with scores of 0 to 2 as "food secure," those with scores 3 to 7 (with children) or 3 to 5 (without children) as "food insecure without hunger." The PI coded participants with scores 8 to 12 (with children) or 6 to 8 (without children) as "food insecure with hunger, moderate," and those with scores 13 to 18 (with children) or 9 to 10 (without children) as "food insecure with hunger, severe."

The PI calculated individual dietary diversity scores (from the rudimentary 24-hour diet recalls) according to FAO criteria by first classifying each participant's reported foods and beverages into 18 groups and coding "yes" (1) or "no" (0) for each group. In keeping with FAO criteria, the PI designated participants who consumed foods from three or fewer groups as having "low" (0) dietary diversity. Those who ate foods from four or five groups had "medium" (1), and those who consumed items from six or greater group were classified as having "high" (2) diversity. The PI later conducted bivariate analyses with a dichotomized version of the dietary diversity variable; "low" and "medium" were collapsed into "not diverse" (1), while "high" was coded as "diverse" (0).

Just as the key indicator variables required re-coding based on established criteria, the PI also had to recode some clinical data according to FWFHP standards, which were based on conventional standards for health indicators. For example, the PI classified women with hemoglobin levels less than 12 mg/dL as "anemic" based on FWFHP standards, which matched WHO guidelines. The FWFHP took a more conservative

approach than dictated by the WHO for men (92.5% of all clinic attendees), designating 14 mg/dL (instead of 13 mg/dL) as "anemic." The FWFHP also used a slightly more cautious cutoff for hypertension, defining "hypertensive" a blood pressure reading above 135/90 (rather than the CDC's standard 140/90); the PI used the FWFHP's definitions. According to FWFHP standards (taken from the American Diabetes Association), participants whose blood glucose exceeded 125 mg/dL were diabetic, but the PI classified them as having "high blood glucose." Those with blood glucose between 100 and 124 mg/dL were pre-diabetic, but the PI categorized them as having "elevated blood glucose." These FWFHP/ADA standards were based on fasting blood glucose levels, but because the FWFHP clinics were walk-in, nurses were not able to ensure that participants had fasted before the screenings. Most participants completed the screenings immediately after returning from the fields (i.e., before having a chance to eat dinner), so the FWFHP volunteers and the PI assumed their blood glucose levels closely approximated fasting levels. Nevertheless, the PI chose to exercise caution by using the classifications "high blood glucose" and "elevated blood glucose," rather than diagnosing participants as diabetic or pre-diabetic. The FWFHP cutoffs for BMI (kg/m^2), which match CDC definitions, classified "overweight" as BMI between 25.0 and 29.9 and "obese" as BMI 30.0 or above.

The PI conducted a thorough statistical analysis of the quantitative data collected for this study using SAS software, version 9.3 (SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc., Cary, NC, USA). First, the PI constructed a statistical descriptive overview to summarize the population-level distributions of basic clinical data collected for the 400 adults who

attended the 2011 FWFHP night clinics. After excluding all subjects under age 18 years, 385 individuals remained for this analysis. The PI also constructed a descriptive overview for the subset of 62 individuals who completed the survey, which, in addition to clinical data, included the demographic data from the survey, and the calculated food insecurity and diet diversity scores. In the overall population and in the surveyed subset, the PI performed univariate analyses for continuous independent variables to determine the mean and standard deviation and obtained frequency measures for categorical variables. The PI then performed t-tests (for continuous variables) and chi-square tests (for categorical variables) to determine whether the surveyed subset was statistically significantly different from the overall population for the variables of interest. (See Table 2 in Appendix A for description of variables.)

The PI evaluated bivariate associations between health indicators (anemia, hypertension, high blood glucose, and overweight/obesity), diet diversity and food insecurity using chi-square tests and logistic regression. The PI analyzed odds ratios with their 90% confidence intervals and their Wald test P-values to assess the significance of the associations between individual, independent predictors and the four outcomes of interest: anemia, hypertension, high blood glucose, and overweight/obesity. Specifically, the PI modeled the odds of having anemia, hypertension, high blood glucose, and overweight/obesity and identified variables that had statistically significant effects on the odds of having each condition. The PI chose to use alpha=0.1 rather than the conventional, more conservative 0.05 level because detecting potentially clinically important associations in this small sample (n=62) was prioritized above simply identifying statistically significant relationships.

The PI also examined possible confounding of these associations by variables such as level of education, time spent in the U.S., and other demographic characteristics. These potential confounders were selected based on their association with the health outcomes and diet diversity/food insecurity. The primary objective for this portion of the analysis was to determine whether diet diversity and food insecurity were independent risk factors for any of the four adverse health outcomes. To make this assessment, the PI compared (1) the significance of each food security/diet diversity variable as the only predictor of each of the four health outcomes to (2) the significance of each food security/diet diversity variable as a predictor of each health outcome in the presence of potential confounders. If food security/diet diversity was significantly ($p<0.1$) associated with a health outcome in both of the models described above, it was deemed an independent risk factor for that health outcome.

Qualitative data. The PI transcribed interviews and FGDs verbatim. Prior to reading the transcripts, the PI created a preliminary codebook with five deductive codes, one for each of these general themes: health concerns, barriers, community resources, traditional foods, and language (See Appendix A; Table 3). The PI then read each transcript systematically, writing memos to pose questions about and/or highlight salient passages. After reading the transcripts, the PI redefined the health concerns code to include occupational concerns and expanded the community resources code into three codes: health resources, food resources, and social support resources, for a total of seven codes in the final codebook. The PI re-read the transcripts in a focused manner, applying the seven codes where appropriate, and then analyzed the coded segments across all transcripts for repetition of themes, conflicting information within segments coded under

the same code, and intersections between two or more codes. Conclusions drawn from qualitative data reinforced and/or refuted those drawn from quantitative data (and vice versa); inconsistencies called into question the validity of either type of data.

Limitations and delimitations

There are several factors that set boundaries for this study. One limitation is that the relatively small sample size for the survey data may lead to inaccurate parameter estimates. Additionally, because the PI used a convenience sample for the surveys, the quantitative results of the study may have limited generalizability. Furthermore, the fact that the PI included only individuals who attended FWFHP clinics or were patients of the Ellenton Clinic might also limit external validity of the study results, because these individuals might not be representative of all migrant farm workers in southwest Georgia.

There were both limitations and strengths associated with the tools and methods used to collect data for this study. The moderator of the FGDs (not the PI) had no prior training in qualitative data collection; this person's lack of knowledge may have introduced bias into the FGD data. In addition, using a single rudimentary, strictly qualitative 24-hour recall to assess diet diversity meant the PI could not draw any conclusions regarding individual participants' habitual diets. Nevertheless, the PI could analyze diet at the population level using the recall data. Similarly, due to the cross-sectional design of the study, the PI could only evaluate *associations* between food security, diet diversity, and health outcomes; conclusions about *causality* were not permitted. However, migrant and seasonal farm workers are, by definition, a transient population with many undocumented members, and conducting any research, especially follow-up studies, with them is very difficult. The ability of the FWFHP to reach 400

farm workers during the two-week program—62 of whom were included in the PI's surveyed subset—and collect data (albeit cross-sectional) from them was a major strength of the study.

Results

Key statistical findings

Data for FWFHP program participants were collected over 7 nights. Of the 385 participants in night clinics, 22.4% were hypertensive, 49.4% were anemic, 33.5% had high blood glucose and an additional 41.1% had elevated blood glucose, 43.3% were overweight, and 14.3% were obese**.**

Descriptive overview of surveyed subset. Of the 62 participants who completed surveys, 57 (91.9%) were selected from among the farm workers and their family members who attended the 2011 FWFHP night clinics (n=385); the other five were recruited from the Ellenton Clinic waiting room. The survey participants' ages ranged from 18 to 58 years, and 54 of 62 (87.1%) were male. The prevalence of chronic disease in this subsample was similar to that observed in the larger FWFHP night clinic population with the exception of blood glucose; 33.5% of the overall FWFHP population and 34.6% of the surveyed subset had high blood glucose (chi-square value=4.6528; p-value=0.0310; see Tables 5a and 5b in Appendix B for other comparisons between the larger FWFHP population and the surveyed subset). All survey participants spoke Spanish, with 11 people (17.7%) claiming an indigenous dialect as their native language. One participant also spoke conversational English, and 13 (21.0%) said they knew a little English. The majority of survey participants were born in Mexico (58, or 93.6%), but four were natives of other Central American countries. Nearly 60% of the thirty-six survey participants had H-2A guest worker visas, while 25 (40.3%) were working without visas, and one was the unemployed wife of a farm worker. Most employed survey completers worked in field crops (93.6%) and were either paid by contract,

whereby they were paid a specified rate per unit of crops harvested (45.2%), or hourly (51.6%). The average worker had 9.1 years of education and had traveled to the US 4.9 times. He labored for 9.4 hours a day, 6.5 days per week and sent just over half of his income to family members in his home country. The majority of those surveyed had regular transportation to grocery stores, and most had a refrigerator and stove available to them in the places they lived in southwest Georgia (e.g., barracks, mobile homes, etc.). Nevertheless, two-thirds experienced some form of food insecurity, and over 60% had low or medium diet diversity. (See Table 5 in Appendix B for complete descriptive overview of surveyed subset, overall and stratified by food security and diet diversity).

Stratifying on food security revealed a number of statistically significant differences. Namely, the mean blood glucose among food secure individuals was 114.6 mg/dl, compared to 138.2 mg/dl (t-value=-1.83; p-value=0.0733), and prevalence of high blood glucose was 17.7% among the food secure, compared to 42.1% among the food insecure (chi-square value=3.1073; p-value=0.0779). In addition, the strata differed on months spent in Georgia each year (6.8 for secure versus 8.4 for insecure; t-value=-2.12; p-value=0.0395) and percent of income sent to family in another country (66.6% for secure versus 45.5% for insecure; t-value=3.32; p-value=0.0016) (see Tables 5c and 5d in Appendix B for other comparisons).

There were also several statistically significant differences between individuals with high and those with low/medium dietary diversity. For example, individuals with high diversity had, on average, 9.9 years of education, while those with low/medium diversity had 8.6 (t-value=1.73; p-value=0.0907). Among those with high diversity, 20.8% spoke some English, whereas 23.7% of those with low/medium diversity did (chi-

square value=4.3724; p-value=0.0365). Nearly 30% of survey participants with high diversity did not have regular transportation to stores, compared to 36.8% of those with low/medium diversity (chi-square value=-5.4383; p-value=0.0197); 4.2% of people who had high diversity paid for transportation out of pocket, versus 23.7% of people who had low/medium dietary diversity (chi-square value=6.1069; p-value=0.0135) (see Tables 5e and 5f in Appendix B for other comparisons).

Identifying potential confounders. Before analyzing the associations of each health outcome with food insecurity and diet diversity in multivariate models, the PI identified variables that might be potential confounders of these relationships. Several variables were significantly associated with increased odds of being anemic—notably, not having regular transportation (OR=3.50, 90% CI: 1.29, 9.49) and having elevated blood glucose (OR=5.25, 90% CI: 1.20, 23.06). Age (OR=1.11, 90% CI: 1.05, 1.17) and high blood glucose (OR=5.08, 90% CI: 1.41, 18.29) were both associated with increased odds of being hypertensive. Furthermore, age was associated with increased odds of having high blood glucose (OR=1.09, 90% CI: 1.03, 1.14), as were food insecurity (OR=3.39, 90% CI: 1.05, 11.02), days per week worked (OR=2.81, 90% CI: 1.08, 7.29), and overweight/obesity (OR=3.13, 90% CI: 1.13, 8.66). There were two notable variables associated with decreased odds of being overweight/obese: possession of an H-2A visa (OR=0.20, 90% CI: 0.08, 0.51), and the absence of a stove in the home (OR=0.30, 90% CI: 0.09, 0.97). On the other hand, age (OR=1.05, 90% CI: 1.01, 1.10) and days worked per week (OR=2.80, 90% CI: 1.31, 5.99) were both associated with increased odds of being overweight/obese. (See Tables 6, 7, 8, and 9 in Appendix B for exhaustive bivariate analysis data.)

Associations between food insecurity and health outcomes. In multivariate analysis, food insecurity was associated with a three-fold increase in the odds of having high blood glucose (crude OR=3.394, 90% CI: 1.045, 11.020 and adjusted OR=3.347, 90% CI: 1.025, 10.924). Food insecurity was also associated with a significant reduction in the odds of anemia; that is, survey participants who were food insecure were almost 84% less likely to be anemic than those who were food secure (AOR=0.163, 90% CI: 0.044, 0.600; Table 10). Food insecurity was not independently and significantly associated with the other three health outcomes.

Table 10: Associations between food insecurity and health outcomes (p < .10*)

HEALTH OUTCOME	*CRUDE OR (90% CI)*	*P-VALUE*	*ADJUSTED OR*[1] *(90% CI)*	*P-VALUE*
Anemia	0.457 (0.167, 1.255)	0.2022	0.163 (0.044, 0.600)	0.0220*
Hypertension	3.064 (0.786, 11.953)	0.1760	4.931 (0.659, 36.885)	0.1922
High blood glucose	3.394 (1.045, 11.020)	0.0879	3.347 (1.025, 10.924)	0.0930*
Overweight/obesity	0.958 (0..393, 2.336)	0.9374	0.777 (0.260, 2.321)	0.7043

[1]adjusted for height, ride to store, and high blood glucose for the anemia model; high blood glucose and share number for the hypertension model; BMI for the high blood glucose model; and ride to store and high blood glucose for the overweight/obesity model.

Associations between diet diversity and health outcomes. Diet diversity was not significantly and independently associated with anemia, hypertension, high blood glucose, or overweight/obesity in multivariate models (Table 11).

Table 11: Associations between diet diversity and health outcomes (p < .10*)

HEALTH OUTCOME	*CRUDE OR (90% CI)*	*P-VALUE*	*ADJUSTED OR*[1] *(90% CI)*	*P-VALUE*
Anemia	1.547 (0.598, 4.002)	0.4503	1.886 (0.689, 5.158)	0.2999
Hypertension	0.562 (0.194, 1.634)	0.3747	0.409 (0.131, 1.278)	0.1967
High blood glucose	2.000 (0.720, 5.555)	0.2644	1.637 (0.923, 10.149)	0.4444
Overweight/obesity	1.163 (0.490, 2.760)	0.7731	1.572 (0.625, 3.951)	0.4194

[1]adjusted for food insecurity for the anemia model; years of education for the hypertension model; food insecurity for the high blood glucose model; and pays ride for the overweight/obese model.

Key qualitative findings

Health concerns. Health and occupational concerns—both those expressed by farm workers themselves during FGDs and perceptions relayed by informants—were

wide-ranging. The survey data revealed a number of important health issues in the farm worker community in southwest Georgia, including elevated or high blood sugar, overweight / obesity, low/medium dietary diversity, and food insecurity that were similarly discussed in the qualitative research. Specifically in the key informant interviews and the FGDs, one of the most commonly discussed health problems was diabetes. Focus group discussion participants (FGDPs) cited diabetes as one of the biggest health concerns facing their community. KI-1 corroborated this assertion:

> "So, it is a huge problem, a HUGE problem, and it's very hard for farm workers to be diabetics, and diabetics to be farm workers, because…for instance, I have this one lady who works at the packing shed. Lunch is not always at the same time, breakfast is not always at the same time, so it was very difficult for her to eat when she should eat, take her medicine on time, and that sort of thing. A lot of times, when I bring them in and we talk because they're out of control, [those are] some of the issues they bring up [to explain] why they're having difficulty."

KI-1 also mentioned the rising prevalence of obesity among local farm worker children, and FGDPs cited other chronic diseases like hypertension among their major health concerns. However, many of the FGDPs' complaints also centered around more acute conditions such as flu, cough, fever, diarrhea, and vomiting. KI-1 noted that the migrant health clinic frequently treats farm workers for unspecified stomachaches and digestive problems and hypothesized that many of them might be attributable to unfavorable food preparation environments in farm workers' housing units. FGDPs did not mention any occupational hazards, but KI-2 brought up the lack of regulations governing farm work. She did not know of any law in Georgia specifying that farm workers are prohibited from working when the outdoor temperature exceeds a certain point, for example, and she noted that many growers do not comply with rules requiring bathroom facilities and clean

water in the fields. The potential public health ramifications of such violations are far-reaching and should be examined in future studies.

Food insecurity and barriers to accessing healthy foods. As seen in the survey of night clinic clients, food insecurity was prevalent in this population of migrant farmworkers (61%). Problems with accessing healthy foods were echoed by participants in FGDs. The barrier that was most frequently mentioned by the FGDPs was not having enough money to pay for things their families need/want. This barrier is perhaps not surprising in light of the survey findings that the average farm worker sends 52.4% of his/her earnings to family members in another country (e.g., Mexico). FGDPs mentioned several ways women in their community save money; buying cheaper versions of certain food items and shopping at local Mexican stores (where prices tend to be lower than those at Wal-Mart) were two tactics. Even for women who manage to make ends meet financially, however, transportation is often a significant barrier to accessing healthy foods, as many women in the farm worker community do not drive and must rely on their husbands or other individuals to drive them to stores (often for a fee).

Food choices. Whether from charitable organizations like the food bank or from grocery stores**, t**here were many discrepancies between which foods were available in the local community, (e.g., American/"junk" foods, meats) and which foods farm workers typically preferred to eat (e.g., traditional Hispanic foods, fruits and vegetables). One FGDP attributed the discrepancy in food choices to cost:

> "*Bueno, de verdad es porque nos gusta la carne fresca. Un ejemplo--en México, las verduras son más económicos. Allí, comimos más verduras y no comimos tanta carne. Pero aquí, nos obliga comer carne, porque las verduras son muy caras. En México, en Hidalgo, la carne es fresca, y las verduras no son muy caras.*

> Well, truthfully, it's because we like [to eat] meat that's fresh. For example—in Mexico, vegetables are more affordable. There, we eat more vegetables, and we don't eat so much meat. But here, we're obligated to eat meat, because vegetables are very expensive. In Mexico, in Hidalgo, the meat is fresh, and vegetables aren't so expensive."

Language barriers did not appear to play a role in these decisions, as none of the FGDPs mentioned struggling with language obstacles when choosing foods for their families.

Many FGDPs said typical women in their community allocate one-third to one-half of grocery money to meat, pizza, soda, and sweets, largely because their children request these products at home after eating them at school and because these items are more affordable than fresh produce. Similarly, KI-1 postulated that this shift in dietary patterns and "over-indulgence" of children in the farm worker community has been made possible by easy access to low-cost, calorie-dense foods in the United States. The FGDPs further elaborated that, in their home countries (e.g., Mexico for the majority of them), people eat considerably less meat and more fruits and vegetables because the latter are much more affordable than they are in the US. These qualitative observations find quantitative support in the high prevalence of low/medium dietary diversity among survey participants (61.3%; see Table 5). Although many FGDPs indicated they would prefer traditional Hispanic foods, they tended to buy "American" foods due to convenience, preferences for these foods by children, and/or lower prices.

Food resources. According to KI-1, most farm workers are allowed to take vegetables home from the fields where they work, but this practice is not readily taken up by farm workers due to lack of familiarity with certain vegetables, like broccoli. Some FGDPs were aware of food stamps through the Supplemental Nutrition Assistance Program (SNAP), but none of them expressed familiarity with the program or said they

had received food stamps. This lack of familiarity might be due to SNAP regulations that bar all undocumented immigrants from receiving benefits; documented immigrants can receive benefits if they are children, disabled, or have lived in the US legally for at least five years (Food Research and Action Center, 2010).

Members of *all* three FGDs were familiar with the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). Their knowledge about the program likely came from information provided by the clinic regarding applying for WIC benefit. Several participants suggested that applying for WIC benefits would be a way for a woman in the farm worker community to help her family eat healthier foods. KI-1 echoed this recommendation but pointed out that there are often challenges associated with qualifying for/obtaining WIC benefits (e.g., finding transportation to the WIC office).

KI-1 described the clinic's nutrition education course as a way for families to learn about healthy eating. While many FGDPs expressed interest in learning more about the course, very few of them had heard of the program prior to attending the FGD. Likewise, the FGDPs did not mention the local food bank as a source of assistance, which poses the (potentially difficult to answer) question of how frequently migrant farm workers actually use the food bank. Nevertheless, two key informants discussed the food bank at length. KI-1 pointed out that while the food bank provides food to those in need, individuals/families are only allowed to request food once every three months. KI-3 also acknowledged that there are limits in place but said the rule was one request per thirty days. Further clarification about this discordant information provided by KI-1 and KI-3 revealed that, while the food bank used to allow only one request per person/family every

three months, their current guidelines do, indeed, permit one request every thirty days. In addition, KI-3 said the food bank makes exceptions to this rule in emergency situations. Referral agencies can make their own rules about requests; for example, the local Division of Family and Children Services (DFCS) office still imposes a limit of one request every three months. KI-1 explained that the clinic staff members were all under the impression that the DFCS guideline/the food bank's former restriction applied to the clinic's referrals, and they were unaware that they could submit requests as often as once every thirty days per person/family. KI-1 said that they would implement a new policy to match the food bank's rule (i.e., one request allowed every thirty days).

Despite the FGDPs' apparent lack of familiarity with the food bank, KI-3 estimated that 10% of food bank clients in 2010 were Hispanic (though it is unknown how many of these individuals were farm workers), and the food bank's presence in the community is strong. KI-3 acknowledged the important role of the community in supplementing the food bank's government-funded food:

> "I can't say enough about Colquitt County. It supports the food bank. I mean, they have supported us, and if we ran low on funds, I probably could just run an ad in the paper, and it [donations] would just start coming in."

In addition, KI-3 cited the partnerships with referral agencies as a major reason why the food bank is able to operate smoothly throughout the year. KI-1 agreed that the food bank is a useful resource but brought up the challenges farm workers might face when receiving foods with which they are not familiar (e.g., grits instead of corn flour for making tortillas). To that end, a volunteer group set up a small food bank consisting of Hispanic foods in the migrant health clinic in 2011, but KI-1 was not sure about plans to sustain this project in the future. The challenges associated with the various community

food resources in southwest Georgia begin to elucidate the mechanisms by which migrant farm workers can experience food insecurity, even as they harvest fresh produce for a living.

Health resources. While they are few in number and some were unfamiliar to the FGDPs, there are a handful of health resources available to help farm workers in the southwest Georgia community deal with the diet-related health conditions facing them. Not surprisingly, there were some commonalities in the discussions about barriers to accessing healthy food and barriers to accessing these healthcare and health resources. The local migrant health clinic, for example, offers a holistic approach to health that encompasses clinical care and health education. KI-1 highlighted the clinic's nutrition education course; however, members of only one of the three FGDs were familiar with this program. Meanwhile, KI-3 mentioned the role of the Red Cross, Mental Health Services, and other organizations in referring people to the food bank. He estimated that most farm workers who use the food bank are referred by Mental Health Services. During the FGDs, participants were familiar with the clinic's basic services but (in general) did not express knowledge of extra programs or outside organizations. The FGDPs and the key informants alike acknowledged that, while there are a handful of health resources available to them, farm workers are often not informed about their existence and encounter many barriers when trying to access these resources in southwest Georgia. Several women said that their families frequently did not have enough money to buy everything they needed/wanted; childcare and medical attention were mentioned as priorities that must often be foregone. It is possible that there is a sort of "feedback" cycle wherein some women do not go to the clinic often due to financial constraints, and

therefore, those same women do not have the opportunity to learn about the clinic's full range of services.

Discussion and conclusion

Summary of study

Study design and goals. The current study used a cross-sectional mixed methods design to understand the associations between food insecurity, diet diversity, and health outcomes, including anemia, elevated/high blood glucose, hypertension, and overweight/obesity, among migrant farm workers in southwest Georgia and the ways in which these farm workers perceive their own health and access to healthy food.

A high prevalence of both food insecurity (66.1%) and low/medium dietary diversity (61.3%) was observed. Additionally, in the surveyed subset, 22.4% were hypertensive, 49.4% were anemic, 33.5% had high blood glucose and additional 41.1% had elevated blood glucose, and 57.7% were overweight or obese. While food insecurity was an independent risk factor for odds of high blood glucose, it was associated with decreased odds of anemia. Dietary diversity was not found to be significantly associated with, nor was it an independent risk factor for, any of the four health outcomes. The qualitative data revealed a disconnect between the resources available to help migrant farm workers and their families eat healthy foods and the workers' knowledge and the accessibility of these resources.

Discussion of findings

Prevalence of disease and food insecurity. Estimates of chronic disease and food insecurity prevalence among migrant farm workers are often difficult to obtain, but some data are available for comparison to the current study. For instance, Hill, et al. (2011) found, using the same 18-item questionnaire used by the PI of this study, that 62.8% of their 2009 FWFHP survey participants experienced some level of food insecurity. The slight increase in prevalence of food insecurity found in the present study (66.1%) might

be attributable to the transient nature of the population and the fact that the characteristics of the 2011 FWFHP clinic attendees may have differed significantly from those of the 2009 attendees. Hill, et al. (2011) also found the average BMI of their food secure survey participants was 26.3, while that of the food insecure individuals was 26.1 (p-value for comparison of the groups=0.58); the equivalent values for this study were 26.2 and 26.4, respectively (p-value=0.9098). The survey participants in the Hill, et al. (2011) study provide the most appropriate comparison to those in the present study, but those authors did not report prevalence data for anemia, diabetes, or hypertension, nor did they investigate the association of food insecurity with risk of disease.

Discrepancies in knowledge. What emerged from the qualitative data was a picture of a community in which there are some resources available to help migrant farm workers access healthy foods (e.g., bilingual staff members at many organizations that work with migrants); however, the workers often did not know about these resources. A prime example of this situation was the contrast between KI-1's enthusiastic description of the food and nutrition course offered through the Ellenton Clinic and the fact that women in two of the three FDGs had never heard of this course. Nevertheless, the women expressed interest in learning more about it. In a similar fashion, KI-3 extolled the local community's support of the food bank, but the FGDPs did not mention the food bank at all. Whether this was because the women did not know about the food bank or because they knew about it but did not view it as a helpful resource to women in their community remains unknown. Even between key informants, there were discrepancies in their reports of the guidelines for requesting food from the food bank; KI-1 said individuals/families were allowed to make requests only once every three months, while

KI-3 described a once-monthly rule. While referral agencies are allowed to implement their own limits on requests for food from the food bank, the discrepancy between the two informants' reported guidelines was actually due to a misunderstanding. In the past, the food bank has limited requests to once every three months, and some referral agencies still use this guideline (e.g., the local DFCS office). Until the PI asked for clarification about the discrepancy between the guidelines, KI-1 and other clinic employees were under the impression they had to adhere to the once every three months rule. After the PI clarified the rules with KI-1 and KI-3, KI-1 indicated that the clinic would start referring patients to the food bank as often as once every thirty days, as needed. This alteration in the clinic's rule will potentially have far-reaching positive effects on families in need of assistance.

Possible language barriers. There are several potential reasons why the FGDPs were completely unfamiliar with the food bank, despite it being a well-known food resource in the local community. One possibility is that language barriers prevent the workers and their families from learning about the food bank's services. Indeed, only one (1.6%) survey participant spoke conversational English, with 21.0% speaking a little English, and 77.4% speaking none, so it is possible that language barriers to accessing healthy food and health care are prevalent in this population. While none of the FGDPs mentioned language as a barrier to accessing healthy food, KI-3 mentioned that the food bank sometimes used newspaper and/or radio advertisements to solicit donations, which, incidentally, also serve as advertising for the food bank's existence and its services. However, the local newspapers and most radio stations are printed and broadcast, respectively, in English. The roughly three-quarters of farm workers who speak no

English are completely isolated from these advertisements. It is possible that they might hear about the food bank at the clinic, where staff members process food requests for needy patients. Of course, 43% of farm workers interviewed for the most recent National Agriculture Workers Survey (NAWS) reported that they did not use any healthcare services in the US in the past two years, presenting another barrier to accessing information about the food bank and other community resources (Sologaistoa, 2011).

Ostracization of migrant farm workers. The obstruction of adequate nutrition and the associated health outcomes caused by poor living conditions are symptoms of the deterioration of the US migrant farm labor system in recent decades. Increasingly anti-immigrant sentiments in some parts of the country have facilitated the de facto segregation of migrant farm workers from the general population (Sologaistoa, 2011). Many migrant farm workers already live in isolated settings due to the rural locations of their jobs, but systemic ostracization, particularly evident in light of legislation such as Georgia's HB 87 (Ramsey, et al., 2011), has further excluded them from society, forcing them to exist with little contact with or support from the outside world. Issues surrounding immigration, including but not limited to road blocks and raids near health clinics, were cited by respondents to the Southeast Migrant Health Questionnaire as the number one problem impacting farm workers; such measures have given farm workers legitimate reason to be fearful of seeking healthcare in Georgia and other regions where anti-immigration laws are in place (Sologaistoa, 2011). It has been shown that strong social networks can protect against food insecurity (Borre, et al., 2010); this is a protective factor migrant farm workers—namely, those like the 66.1% of the surveyed subset in this study who faced some form of food insecurity—cannot experience due to

the physical and social isolation brought on by fear of confrontations with local police if they venture out into the communities surrounding their places of work/housing facilities.

Comparisons to other studies

The high prevalence of any type of food insecurity observed in this population (66.1%) was comparable to that found in a 2009 study (62.83%), which was also conducted in southwest Georgia through the Emory Physician's Assistant's screening program with farmworkers (Hill, et al., 2011). The goal of the previous study was to study the effect of H-2A guestworker visa status on food insecurity; associations of food insecurity with health outcomes were not assessed. The present study expanded upon the approach of Hill, et al. (2011) by extending the analysis to include health outcomes, diet diversity, and qualitative data via interviews and FGDs. In future summers, FWFHP volunteers or other affiliated researchers might consider continuing to administer the USDA 18-item food security survey in order to assess trends in food insecurity over time.

The data also suggest that food insecurity was an independent risk factor for high blood glucose. This finding mirrors that observed by Fitzgerald, et al. (2011), who found food insecurity to be an independent risk factor for type 2 diabetes (OR=3.33, 95%CI: 1.34-8.23). There are several important differences to note between the two studies, however. First, the Fitzgerald, et al. (2011) study was conducted with Latina (female) subjects, while nearly all of the surveyed subjects in this study were Latinos (males). Next, the tools used to measure food security were not identical; Fitzgerald, et al. (2011) used a 6-item version of the USDA food security survey, while the PI of this study used the 18-item version. It is possible that participants might receive different scores based on which survey is used. Finally, the means of classifying participants' diabetes status were

different for the two studies. Fitzgerald, et al. (2011) classified women as "diabetic" if they answered "yes" to the question, "Have you ever been told by a doctor that you have diabetes?" Asking this question to research participants has been shown to be a reliable way to ascertain if they actually are diabetic (Fitzgerald, et al., 2011). However, given the limited access to healthcare among this population, Fitzgerald, et al. (2011) may have missed a number of cases who were diabetic but had never been diagnosed by a doctor. In the present study, "high blood glucose" and "elevated blood glucose" were defined according to the standards of the FWFHP (based on ADA standards for diabetic and pre-diabetic); using this biological indicator is a more valid way to determine participants' diabetes status. However, the blood glucose readings in this study were not collected under controlled conditions (i.e., it was not known whether participants fasted before the screening), so the PI could not make diabetes diagnoses. In addition, neither the techniques used to determine blood glucose status in this study nor the question asked of participants in the Fitzgerald, et al. (2011) study can provide as definitive a diagnosis as, perhaps, a hemoglobin A1C screening.

Strengths and weaknesses of study

One weakness of this study is that the data are all cross-sectional, so there is no way to analyze trends over time. In addition, the relatively small sample size of the surveyed subset (n=62) likely contributed to decreased power to detect true associations and also may have increased the likelihood of type II errors (e.g., "false negatives"). However, the transient nature of the migrant farm worker population makes them a particularly difficult group to reach for any type of research, especially follow-up studies. An important strength of the study is that the PI complemented the survey data with qualitative data to

understand issues around access to healthy food and awareness of food related services. Thus, this study contributes to a more nuanced understanding of the relationships between food security, diet diversity, and adverse health outcomes in this population of migrant farm workers in southwest Georgia than would have been provided by quantitative data alone. To the PI's knowledge, no research has been published, to date, that investigates these specific associations. The Hill, et al. (2011) study explored many of the risk factors for food insecurity in the same population and found H-2A status to be protective against food insecurity, but those authors did not study the associations with dietary diversity and health outcomes.

Recommendations

Research. Additional quantitative and qualitative research should be conducted with farm workers to clarify the causal pathways between food insecurity, low dietary diversity, and adverse health outcomes and to provide greater context for these relationships. Such research efforts are particularly important in states like Georgia, where anti-immigration legislation prevents farm workers from seeking necessary healthcare. Specifically, future studies should focus on the link between food insecurity and high blood glucose/diabetes in an effort to confirm or refute the results of the present study and others (Fitzgerald, et al., 2011). Additionally, researchers should investigate the relationship between food insecurity and anemia among migrant farm workers. The present study found food insecurity to be protective against anemia, but a 2009 study that used NHANES data revealed that food insecurity was a risk factor for anemia in US adolescents (Eicher-Miller, Mason, Weaver, McCabe, & Boushey, 2009). These two studies are not directly comparable, however, due to the different populations studied.

Future research on anemia and food insecurity among migrant farm workers can confirm or refute the results of the current study. The PI of this study did not find that H-2A status differed based on food security or dietary diversity status, but given the results of Hill, et al. (2011), future studies should examine visa status as a risk factor for food insecurity/low diet diversity as well as for adverse health outcomes.

Public health practice. The Ellenton Clinic in southwest Georgia has an outreach program in place, designed to provide care to farm workers living in isolated labor camps who might otherwise not receive or seek healthcare except in emergency situations. In addition, the FWFHP reaches hundreds of farm workers and their family members each summer when the number of workers in the area is at its peak. The clinic and the FWFHP are examples of successful delivery vehicles for migrant healthcare and should be used as models for expanding the healthcare options available to this population. Because migrant farm workers are a transient population, follow-up care for the chronic health conditions associated with food insecurity can be difficult for the workers as patients to obtain, as well as for healthcare providers to administer (National Center for Farmworker Health, 2002). More innovative approaches—following the model of the Ellenton Clinic's outreach program and the FWFHP—to educating farm workers about health risks and ensuring continuity of care and follow-up for chronic diseases are needed. Health education might be enhanced by training outreach workers and FWFHP volunteers on creative ways to present health information to farm workers, for example, through short theatrical performances in the fields, similar to those produced by Student Action with Farmworkers interns in North Carolina (Student Action with Farmworkers, 2011). The goals of ensuring continuous care and follow-up for chronic conditions will

be more difficult to attain, given the transient nature of the farm worker population. Nevertheless, all of these recommendations are consistent with the top priorities identified by migrant health centers in the Southeast: outreach, health literacy, and cultural competence (Sologaistoa, 2011).

Education. In addition to the issues of access to healthcare and the associations with food insecurity and adverse health outcomes, Quandt, et al. (2004) found that parents' level of education (especially that of the mother) was significantly related to food insecurity in households with children, perhaps because it serves as a proxy for income and access to services. Thus, encouraging communities to support Migrant Head Start and other educational programs might have far-reaching consequences on reducing food insecurity. The summer school program for children of migrant farm workers at Cox Elementary in Moultrie, Georgia, is one example of a successful supplemental educational program that might provide long-term protection against food insecurity. Communities should support other such programs, and education-based efforts to improve farm worker health should extend beyond the confines of formal education. For example, migrant health clinic's outreach workers should endeavor to educate farm workers about the full range of healthcare and food resources available to them and their rights under local and national legislation. Many migrant health centers in the Southeast have already begun to prioritize increasing outreach efforts and educating farm workers about chronic diseases and other relevant health concerns (Sologaistoa, 2011).

Policy. It is clear that systemic changes are needed in order to improve health outcomes in migrant farm workers and reduce the risk of food insecurity and improve diet diversity. Indeed, "long-term reduction of food insecurity risk must be rooted in the

elimination of poverty and improvement of social justice for farm workers by increasing wages, self-efficacy, and control over their labor and lives" (Borre, et al., 2010). Building capacity and support for the aforementioned health and educational programs will likely have large impacts on the health and quality of life of migrant farm workers living in southwest Georgia. In addition, there will need to be political will to enact policies that support both social justice and access to healthcare regardless of migration status and to repeal repressive legislation like HB 87 (Ramsey, et al., 2011). Farm worker organizations, advocates, and lobbyists should educate legislators about the negative ramifications of anti-immigration laws.

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Appendix A: Descriptions of variables and codes

Table 2: Descriptions of variables included in quantitative analyses	
Variable	***Description***
CATEGORICAL OUTCOME VARIABLES	
Anemic	For men: hemoglobin <14 mg/dL For women: hemoglobin <12 mg/dL
Hypertensive	Systolic BP >135, diastolic BP >90
High blood glucose	High blood glucose: glucose >125 mg/dL Elevated blood glucose: 100mg/dL<glucose<124 mg/dL
Overweight/obese	BMI >25 kg/m^2
CATEGORICAL INDEPENDENT VARIABLES	
Sex	Male or female
H2A	Possession of H-2A temporary guestworker visa
Native language[1]	Spanish, Mam, Nahuatl, Sotzil, Tojolabal, or Zapotec
Origin[1]	Country of origin (El Salvador, Guatemala, Honduras, Mexico, or USA)
Speaks English	Any amount of English skills
Amount of English	None, a little, conversational, or fluent
Type of work[2]	Field, packing house, student, trees, or unemployed
Method of payment	By contract, daily, hourly, student, or unemployed
Ride to store	Ready access to transportation to buy food
Fridge	Ready access to refrigerator in home
Stove	Ready access to stove in home
Shares food	Food is shared with other members of household
Eats crops	Any portion of diet comes directly from fields
Has kids	Has any children
Kids in GA	Has any children living in Georgia
Live GA	Lives with other workers or family members in Georgia
Pays ride	Pays any amount for transportation
Bathroom works[3]	Bathroom in home is functional
Sink and soap[3]	Sink in home is functional and soap is available
Food Insecurity score	Food secure, food insecure without hunger, food insecure with hunger (moderate), or food insecure with hunger (severe)
Food Insecurity binary	Any level of food insecurity (versus full food security)
Diversity score	Low, medium, or high diet diversity
Diversity binary	Not diverse: low or medium diversity Diverse: high diet diversity
CONTINUOUS INDEPENDENT VARIABLES	
Age	Age in years
SBP	Systolic blood pressure in mmHg
DBP	Diastolic blood pressure in mmHg
Glucose	Blood glucose in mg/dL
Height	Height in inches
Weight	Weight in pounds
BMI	Body mass index in kg/m^2
School years	Total years of schooling
Times to US	Number of times traveled to US from home country
Months in US	Number of months per year spent in US
Months in GA	Number of months per year spent in Georgia
Frequency home	Number of trips back to home country per year
Months at home	Number of months per year spent in home country
Hours of work	Number of hours worked per day

Days of work	Number of days worked per week
Money per week	Income per week, in dollars
Money kept	Amount kept per week, in dollars
Money to family	Amount sent to family per week, in dollars
Percent of money sent	Money to family divided by money per week
Share number	Number of people with whom meals are shared
Percentage of crops	Portion of diet that comes directly from fields
People in house	Total number of people living in house in Georgia
People in room	Total number of people sleeping in the same room in Georgia
Cost of ride	Amount paid daily for transportation, in dollars

[1]These variables were removed from analysis because vast majority (82.5%) of subjects' native language was Spanish, and 92.1% were born in Mexico.
[2]This variable was removed, because 92.1% worked in field crops.
[3]These variables were removed, because all subjects answered "yes" to both questions.

Table 3: Codebook with definitions	
Code	***Definition***
Health/occupational concerns	Captured all mentions of farm workers' and their families' (or key informants' insights into) anxieties, fears, concerns, and hopes related to health conditions. Included discussions about hazardous conditions on the job and whether or not farm workers are aware of the hazards.
Barriers to accessing healthy foods	Encompassed any apprehensions/concerns farm workers and their families might have regarding their ability to access/purchase healthy foods and health services.
Health resources	Included any mention of a service, organization, or resource that provides health information or care in the local community
Food resources	Included any instances mentioning community services, organizations, or resources that provide food or nutrition information or assistance.
Social support resources	Encompassed any mention of organizations, resources, or services in the local community that provide social opportunities or support.
Traditional foods	Captured discussions of traditional foods, non-traditional foods, and the similarities and differences between the two.
Language	Included any discussion of Spanish, English, or indigenous dialects and the challenges, barriers, and opportunities related to language that exist in the local community.

Appendix B: Additional statistics

Table 4: Descriptive overview for all FWFHP night clinic attendees		
CATEGORICAL VARIABLES		
Variable	**Distribution N (%)**	
Male sex (n=385)	356 (92.5%)	
Hypertensive (n=312) Systolic BP >135 or diastolic BP >90	70 (22.4%)	
Anemic (n=264) For men: hemoglobin <14 mg/dL For women: hemoglobin <12 mg/dL	129 (49.4%)	
Blood glucose (n=263)		
High Glucose >125 mg/dL	88 (33.5%)	
Elevated 100mg/dL<glucose<124 mg/dL	108 (41.1%)	
Overweight (n=300) 25 kg/m^2>BMI>30 kg/m^2	130 (43.3%)	
Obese BMI> 30 kg/m^2	43 (14.3%)	
Overweight/obese (n=300) BMI >25 kg/m^2	173 (57.7%)	
CONTINUOUS VARIABLES		
Variable	**Distribution mean (sd)**	**Min, max**
Age (n=380)	31.1 (10.2)	18, 66
SBP (n=312)	125.6 (12.1)	90, 162
DBP (n=312)	79.2 (9.9)	50, 122
Hemoglobin (n=261)	13.8 (1.6)	6.0, 17.3
Glucose (n=263)	123.5 (43.2)	69, 485
Height (n=300)	64.4 (3.0)	53.0, 71.5
Weight (n=300)	154.3 (27.9)	90, 270
BMI (n=300)	26.2 (4.3)	17.9, 48.2

Table 5: Descriptive overview for surveyed subset attendees (n=62 unless otherwise noted)					
CATEGORICAL VARIABLES					
	Distribution N (%)				
Variable	**Overall**	**Food secure**	**Food insecure**	**High diet diversity**	**Low/medium diet diversity**
Male sex	54 (87.1%)	19 (90.5%)	35 (85.4%)	21 (87.5%)	33 (86.8%)
Hypertensive	12 (19.4%)	2 (9.5%)	10 (24.4%)	6 (25.0%)	6 (15.8%)
Anemic (n=53)	26 (49.1%)	10 (62.5%)	16 (43.2%)	8 (42.1%)	18 (52.9%)
Blood glucose (n=55)					
High	19 (34.6%)	3 (17.7%)	16 (42.1%)	5 (25.0%)	14 (40.0%)
Elevated	26 (47.3%)	10 (58.8%)	16 (42.1%)	10 (50.0%)	16 (45.7%)
H2A	36 (58.1%)	14 (66.7%)	22 (53.7%)	16 (66.7%)	20 (52.6%)
Native language					

Spanish	51 (82.3%)	20 (95.24%)	31 (75.6%)	23 (95.8%)	28 (73.7%)
Indigenous dialect	11 (17.7%)	1 (4.8%)	10 (16.1%)	1 (4.2%)	10 (16.1%)
Origin					
Mexico	58 (93.6%)	21 (100.0%)	37 (90.2%)	22 (91.7%)	36 (94.7%)
Other Central American country	4 (6.5%)	0 (0%)	4 (9.8%)	2 (8.3%)	2 (5.3%)
Speaks English	14 (22.6%)	8 (38.1%)	6 (14.6%)	5 (20.8%)	9 (23.7%)
Amount English					
None	48 (77.4%)	13 (61.9%)	35 (85.4%)	19 (79.2%)	29 (76.3%)
Little	13 (21.0%)	8 (38.1%)	5 (12.2%)	5 (20.8%)	8 (21.1%)
Conversational	1 (1.6%)	0 (0%)	1 (2.4%)	0 (0%)	1 (2.6%)
Type of work					
Field	58 (93.6%)	20 (95.2%)	38 (92.7%)	20 (83.3%)	38 (100.0%)
Packing house	2 (3.2%)	0 (0%)	2 (4.9%)	2 (8.3%)	0 (0%)
Trees	1 (1.6%)	0 (0%)	1 (2.4%)	1 (4.2%)	0 (0%)
Unemployed	1 (1.6%)	1 (4.8%)	0 (0%)	1 (4.2%)	0 (0%)
Method of payment					
Contract	28 (45.2%)	12 (57.1%)	16 (39.0%)	10 (41.7%)	18 (47.4%)
Daily	1 (1.6%)	1 (4.8%)	0 (0%)	0 (0%)	1 (2.6%)
Hourly	32 (51.6%)	7 (33.3%)	25 (61.0%)	13 (54.2%)	19 (50.0%)
Unemployed	1 (1.6%)	1 (4.8%)	0 (0%)	1 (4.2%)	0 (0%)
No ride to store	21 (33.9%)	3 (14.3%)	18 (43.9%)	7 (29.2%)	14 (36.8%)
No fridge	16 (25.8%)	6 (28.6%)	10 (24.4%)	8 (33.3%)	8 (21.1%)
No stove	17 (27.4%)	7 (33.3%)	10 (24.4%)	8 (33.3%)	9 (23.7%)
Shares food	49 (79.0%)	19 (90.5%)	30 (73.2%)	19 (79.2%)	30 (79.0%)
Does not eat crops	16 (25.8%)	6 (28.6%)	10 (24.4%)	7 (29.2%)	9 (23.7%)
Has kids	44 (71.0%)	13 (61.9%)	31 (75.6%)	18 (75.0%)	26 (68.4%)
Kids in GA	12 (19.4%)	2 (9.5%)	9 (21.95%)	4 (16.7%)	7 (18.4%)
Lives with other farm workers in GA	49 (79.0%)	19 (90.5%)	30 (73.2%)	19 (79.2%)	30 (79.0%)
Pays ride	10 (16.1%)	21 (100.0%)	10 (24.4%)	1 (4.2%)	9 (23.7%)
Insecurity score					
Food secure	21 (33.9%)	21 (100.0%)	0 (0%)	11 (45.8%)	10 (26.3%)
Food insecure without hunger	20 (32.3%)	0 (0%)	20 (48.8%)	6 (25.0%)	14 (36.8%)
Food insecure with hunger, moderate	12 (19.4%)	0 (0%)	12 (29.3%)	4 (16.7%)	8 (21.1%)
Food insecure with hunger, severe	9 (14.5%)	0 (0%)	9 (22.0%)	3 (12.5%)	6 (15.8%)
Diversity score					
Low	5 (8.1%)	1 (4.8%)	4 (9.8%)	0 (0%)	5 (13.2%)
Medium	33 (53.2%)	9 (42.9%)	24 (58.5%)	0 (0%)	33 (86.8%)
High	24 (38.7%)	11 (52.4%)	13 (31.7%)	24 (100.0%)	0 (0%)
Overweight	21 (33.9%)	8 (38.1%)	13 (31.7%)	7 (29.2%)	14 (36.8%)
Obese	14 (22.6%)	4 (19.1%)	10 (24.4%)	6 (25.0%)	8 (21.1%)
Overweight/obese	35 (56.5%)	12 (57.1%)	23 (56.1%)	13 (54.2%)	22 (57.9%)

CONTINUOUS VARIABLES					
	Distribution mean (sd)				
Variable	**Overall**	**Food secure**	**Food insecure**	**High diet diversity**	**Low/medium diet diversity**
Age	33.0 (10.3)	31.7 (10.1)	33.7 (10.5)	33.3 (10.4)	32.9 (10.4)
SBP	124.2 (12.9)	123.4 (13.5)	124.6 (12.8)	125.7 (14.7)	123.3 (11.8)
DBP	77.4 (9.9)	78.0 (10.2)	77.1 (9.9)	78.2 (9.8)	76.9 (10.1)
Hemoglobin (n=53)	13.9 (1.5)	13.9 (1.2)	13.9 (1.6)	14.3 (1.3)	13.7 (1.5)
Glucose (n=55)	130.9 (63.4)	114.6 (18.4)	138.2 (74.4)	131.5 (85.7)	130.6 (47.7)
BMI	26.3 (5.1)	26.2 (5.8)	26.4 (4.8)	26.3 (5.7)	26.4 (4.8)
School years	9.1 (2.9)	10.1 (2.5)	8.5 (3.0)	9.9 (3.0)	8.6 (2.8)
Times to US	4.9 (4.3)	4.3 (3.8)	5.2 (4.5)	5.5 (6.1)	4.5 (2.6)
Months in US	8.4 (2.9)	7.3 (2.6)	8.9 (3.0)	8.1 (3.3)	8.5 (2.6)
Months in GA	7.9 (3.1)	6.8 (2.6)	8.4 (3.2)	7.9 (3.4)	7.8 (3.0)
Frequency home	0.8 (0.5)	1.0 (0.6)	0.7 (0.5)	0.7 (0.5)	0.9 (0.6)
Months at home	3.5 (2.8)	4.5 (2.5)	3.0 (2.8)	3.8 (3.2)	3.3 (2.5)
Hours of work (n=61)	9.4 (1.1)	9.7 (0.9)	9.2 (1.1)	9.5 (1.3)	9.3 (1.0)
Days of work (n=61)	6.5 (0.6)	6.6 (0.6)	6.4 (0.7)	6.5 (0.6)	6.4 (0.6)
Percent of money sent (n=61)	52.4 (28.0)	66.6 (19.9)	45.5 (29.0)	56.8 (27.1)	49.8 (28.6)
Share number	4.5 (3.6)	5.6 (3.7)	4.0 (3.4)	5.0 (4.2)	4.2 (3.2)
Percentage of crops	15.4 (11.8)	15.8 (14.6)	15.2 (10.3)	16.8 (15.5)	14.5 (8.9)
People in house	13.3 (8.8)	12.2 (6.5)	13.8 (9.8)	14.2 (8.7)	12.7 (8.9)
People in room	12.0 (9.8)	11.1 (7.5)	12.5 (10.9)	13.2 (9.9)	11.3 (9.8)
Cost of ride (n=10)	2.6 (1.7)	N/A	2.6 (1.7)	2 (N/A)	2.7 (1.8)

Table 5a: T-tests comparing overall to subset

Variable	Satterthwaite t-value	P-value
Age	-1.38	0.1714
BMI	-0.19	0.8496
DBP	1.30	0.1972
Glucose	-0.83	0.4116
Hemoglobin	-0.47	0.6416
Height	1.30	0.1961
SBP	0.80	0.4232
Weight	0.58	0.5667

Table 5b: Chi-square tests comparing overall to subset

Variable	Chi-square value	P-value
Anemic	0.0006	0.9809
High blood glucose	4.6528	0.0310
Hypertensive	0.2868	0.5923
Overweight	1.8922	0.1690
Obese	2.6343	0.1046
Overweight/obese	0.0310	0.8602
Sex	2.0288	0.1543

Table 5c: T-tests comparing food secure to food insecure		
Variable	**Satterthwaite t-value**	**P-value**
Age	-0.73	0.4769
SBP	-0.35	0.7264
DBP	0.31	0.7601
Hemoglobin	0.16	0.8704
Glucose	-1.83	0.0733
Height	2.41	0.0191
Weight	0.95	0.3500
BMI	-0.11	0.9098
School years	2.16	0.0363
Times to US	-0.82	0.4159
Months in US	-2.12	0.0396
Months in GA	-2.12	0.0395
Frequency home	1.47	0.1517
Months at home	2.22	0.0316
Hours of work	1.90	0.0634
Days of work	1.38	0.1745
Money per week	2.88	0.0065
Money kept	-2.49	0.0160
Money to family	3.90	0.0003
Percent of money sent	3.32	0.0016
Share number	1.66	0.1052
Percentage of crops	0.17	0.8697
People in house	-0.75	0.4570
People in room	-0.58	0.5635

Table 5d: Chi-square tests comparing food secure to food insecure		
Variable	**Chi-square value**	**P-value**
Sex	0.0057	0.9400
Hypertensive	0.7995	0.3713
High blood glucose	3.1073	0.0779
Anemic	0.5727	0.4492
H2A	1.1900	0.2753
Native language	5.6152	0.3455
Country of origin	4.4446	0.2173
Speaks English	0.0684	0.7937
Amount of English	0.6474	0.7235
Type of work	6.7701	0.0796
Method of payment	2.3703	0.4992
No ride to store	0.3869	0.5339
No fridge	1.1587	0.2817
No stove	0.6882	0.4068
Shares food	0.0004	0.9835
Eats crops	0.2309	0.6308
Has kids	0.3090	0.5783
Kids in GA	0.6922	0.7074
Lives with other farm workers in GA	0.0004	0.9835
Pays ride	4.1422	0.0418
Food insecure	2.5017	0.1137
Overweight	0.2530	0.6150
Obese	0.2267	0.6339
Overweight/obese	0.0062	0.9374

Table 5e: T-tests comparing high to low/medium dietary diversity		
Variable	**Satterthwaite t-value**	**P-value**
Age	0.16	0.8769
SBP	0.69	0.4954
DBP	0.51	0.6136
Hemoglobin	1.49	0.1440
Glucose	0.04	0.9666
Height	0.56	0.5811
Weight	0.02	0.9839
BMI	-0.06	0.9494
School years	1.73	0.0907
Times to US	0.78	0.4443
Months in US	-0.55	0.5862
Months in GA	0.08	0.9395
Frequency home	-1.20	0.2347
Months at home	0.60	0.5521
Hours of work	0.61	0.5476
Days of work	0.69	0.4937
Money per week	-0.24	0.8081
Money kept	-1.19	0.2373
Money to family	0.56	0.5750
Percent of money sent	0.96	0.3402
Share number	0.89	0.3805
Percentage of crops	0.65	0.5215
People in house	0.63	0.5292
People in room	0.74	0.4654

Table 5f: Chi-square tests comparing high to low/medium dietary diversity		
Variable	**Chi-square value**	**P-value**
Sex	0.3227	0.5700
Hypertensive	1.9663	0.1608
High blood glucose	1.2664	0.2604
Anemic	1.6696	0.1980
H2A	0.9650	0.3259
Native language	4.3763	0.4966
Country of origin	2.1901	0.5339
Speaks English	4.3724	0.0365
Amount of English	5.9424	0.0512
Type of work	3.4987	0.3209
Method of payment	6.9701	0.0729
No ride to store	5.4383	0.0197
No fridge	0.1268	0.7218
No stove	0.5581	0.4550
Shares food	2.5097	0.1131
Eats crops	0.1268	0.7218
Has kids	1.2660	0.2605
Kids in GA	2.1016	0.3497
Lives with other farm workers in GA	2.5097	0.1131
Pays ride	6.1069	0.0135
Low/medium dietary diversity	2.5017	0.1137
Overweight	0.3869	0.5339
Obese	0.1311	0.7173
Overweight/obese	0.0832	0.7731

Table 6: Bivariate analyses of associations between independent variables and anemia				
CONTINUOUS VARIABLES				
Variable	**Distribution mean (sd)** **Among not anemic (N=27)**	**Among anemic (N=26)**	**Odds Ratio (90% CI)**	**P-value**
Age	31.3 (9.4)	34.3 (10.1)	1.03 (0.99, 1.08)	0.2620
SBP	124.5 (13.5)	121.7 (10.8)	0.98 (0.94, 1.02)	0.3993
DBP	78.2 (9.6)	75.5 (10.2)	0.97 (0.93, 1.02)	0.3312
Glucose	118.6 (23.9)	146.3 (87.0)	1.01 (1.00, 1.02)	0.1752
Height	64.5 (3.4)	62.8 (3.3)	0.86 (0.737, 0.995)	0.0882
Weight	156.8 (30.8)	143.5 (24.5)	0.98 (0.96, 1.00)	0.0943
BMI	26.7 (5.0)	25.6 (3.9)	0.94 (0.85, 1.05)	0.3529
School years	9.6 (2.6)	9.0 (2.8)	0.93 (0.78, 1.10)	0.4852
Times to US	4.1 (3.2)	4.6 (2.6)	1.07 (0.91, 1.26)	0.4932
Months in US	7.8 (3.2)	8.5 (2.6)	1.08 (0.92, 1.27)	0.4164
Months in GA	7.3 (3.6)	8.0 (2.6)	1.08 (0.93, 1.25)	0.3833
Frequency home	0.9 (0.6)	0.8 (0.5)	0.74 (0.31, 1.78)	0.5785
Months at home	4.0 (3.1)	3.4 (2.4)	0.92 (0.78, 1.09)	0.4188
Hours of work	9.2 (1.0)	9.3 (1.1)	1.03 (0.66, 1.59)	0.9199
Days of work	6.6 (0.6)	6.4 (0.7)	0.57 (0.27, 1.23)	0.2263
Money per week	430.19 (102.51)	417.19 (106.43)	1.00 (0.99, 1.00)	0.6455
Money kept	170.74 (107.46)	194.42 (83.03)	1.00 (1.00, 1.01)	0.3686
Money to family	259.44 (150.31)	222.77 (149.05)	0.998 (0.995, 1.001)	0.3693
Percent of money sent	57.1 (30.8)	49.2 (26.3)	0.99 (0.97, 1.01)	0.3162
Share number	4.6 (3.2)	4.2 (3.7)	0.96 (0.84, 1.10)	0.6412
Percentage of crops	15.3 (11.2)	13.1 (12.2)	0.98 (0.95, 1.02)	0.5012
People in house	15.6 (8.4)	12.4 (8.4)	0.96 (0.90, 1.01)	0.1775
People in room	14.9 (9.3)	10.5 (9.5)	0.95 (0.90, 1.00)	0.0971
Cost of ride	2.93 (1.92)	2.34 (1.58)	0.79 (0.41, 1.54)	0.5642
CATEGORICAL VARIABLES				
Variable	**Frequency N(%)** **Among not anemic (N=27)**	**Among anemic (N=26)**	**Odds Ratio (90% CI)**	**P-value**
Male sex	25 (92.6%)	23 (88.5%)	0.61 (0.13, 2.96)	0.6097
Hypertensive	6 (22.2%)	2 (7.7%)	0.29 (0.07, 1.22)	0.1564
Blood glucose				
High	10 (37.0%)	9 (34.6%)	3.15 (0.69, 14.40)	0.2144
Elevated	10 (37.0%)	15 (57.7%)	5.25 (1.20, 23.06)	0.0653
H2A	18 (66.7%)	15 (57.7%)	1.47 (0.58, 3.74)	0.5012
Speaks English	6 (22.2%)	7 (26.9%)	1.29 (0.45, 3.70)	0.6916
Amount English				
None	21 (77.8%)	19 (73.1%)	Ref	
Little	5 (18.5%)	7 (26.9%)	1.55 (0.52, 4.63)	0.5119
Conversational	1 (3.7%)	0 (0.0%)	<0.001 (<0.001, >999.999)	0.9858

Method of payment				
Contract	12 (44.4%)	13 (50.0%)	ref	
Daily	0 (0.0%)	0 (0.0%)	n/a	n/a
Hourly	15 (55.6%)	13 (50.0%)	0.80 (0.32, 1.98)	0.6859
Unemployed	0 (0.0%)	0 (0.0%)	n/a	n/a
No ride to store	6 (22.2%)	13 (50.0%)	3.50 (1.29, 9.49)	0.0390
No fridge	8 (29.6%)	6 (23.1%)	0.71 (0.25, 2.00)	0.5893
No stove	8 (29.6%)	7 (26.9%)	0.88 (0.32, 2.39)	0.8271
Shares food	22 (81.5%)	20 (76.9%)	0.76 (0.25, 2.32)	0.6830
Does not eat crops	7 (25.9%)	9 (34.6%)	1.51 (0.56, 4.07)	0.4920
Has kids	19 (70.4%)	18 (69.2%)	0.95 (0.35, 2.54)	0.9280
Kids in GA	2 (7.4%)	7 (26.9%)	3.95 (0.94, 16.55)	0.2889
Lives with other farm workers in GA	23 (85.2%)	20 (76.0%)	0.58 (0.18, 1.88)	0.4452
Pays ride	5 (18.5%)	5 (19.2%)	1.05 (0.33, 3.33)	0.9472
Insecurity score				
Food secure	6 (22.2%)	10 (38.5%)	Ref	
Food insecure without hunger	12 (44.4%)	6 (23.1%)	0.30 (0.09, 0.98)	0.0939
Food insecure with hunger, moderate	7 (25.9%)	4 (15.4%)	0.34 (0.09, 1.30)	0.1875
Food insecure with hunger, severe	2 (7.4%)	6 (23.1%)	1.80 (0.37, 8.82)	0.5429
Diversity score				
Low	2 (7.4%)	2 (7.7%)	1.38 (0.22, 8.43)	0.7727
Medium	14 (51.9%)	16 (61.5%)	1.57 (0.59, 4.16)	0.4448
High	11 (40.7%)	8 (30.8%)	Ref	
Food insecure	21 (77.8%)	16 (61.5%)	0.46 (0.17, 1.26)	0.2022
Low/medium diet diversity	16 (59.3%)	18 (69.2%)	1.55 (0.60, 4.00)	0.4503
High blood glucose	10 (37.1%)	9 (34.6%)	0.90 (0.35, 2.31)	0.8543
Overweight/obese	17 (63.0%)	13 (50.0%)	0.59 (0.23, 1.48)	0.3426

Table 7: Bivariate analyses of associations between independent variables and hypertension

CONTINUOUS VARIABLES

	Distribution mean (sd)			
Variable	**Among not hypertensive (N=50)**	**Among hypertensive (N=12)**	**Odds Ratio (90% CI)**	**P-value**
Age	31.0 (9.1)	41.7 (11.2)	1.11 (1.05, 1.17)	0.0034
SBP	119.9 (10.0)	142.0 (7.3)	195.69 (<0.001, >999.999)	0.5524
DBP	75.1 (8.7)	86.8 (9.2)	1.21 (1.09, 1.33)	0.0019
Hemoglobin	13.8 (1.4)	14.3 (1.7)	1.29 (0.82, 2.05)	0.3567
Glucose	130.5 (68.7)	132.7 (23.1)	1.00 (0.99, 1.01)	0.9261
Height	63.7 (3.4)	64.3 (2.7)	1.07 (0.90, 1.28)	0.5128

Weight	148.7 (27.8)	164.8 (41.3)	1.02 (0.999, 1.034)	0.1159
BMI	25.8 (4.4)	28.5 (7.3)	1.10 (0.98, 1.22)	0.1109
School years	9.4 (2.7)	7.8 (3.6)	0.82 (0.67, 1.01)	0.1112
Times to US	4.3 (2.9)	7.0 (7.6)	1.13 (1.01, 1.27)	0.0860
Months in US	8.4 (3.0)	8.3 (2.6)	0.99 (0.83, 1.20)	0.9771
Months in GA	7.8 (3.2)	8.3 (2.6)	1.06 (0.89, 1.27)	0.5617
Frequency home	0.8 (0.6)	0.8 (0.4)	1.12 (0.42, 3.00)	0.8461
Months at home	3.4 (2.9)	3.7 (2.6)	1.03 (0.85, 1.25)	0.7903
Hours of work	9.3 (1.0)	9.8 (1.2)	1.62 (0.94, 2.80)	0.1439
Days of work	6.5 (0.6)	6.4 (0.6)	0.77 (0.33, 1.78)	0.6106
Money per week	426.54 (103.71)	403.18 (100.56)	0.998 (0.992, 1.003)	0.4930
Money kept	183.70 (91.15)	189.09 (98.81)	1.001 (0.995, 1.007)	0.8588
Money to family	242.84 (150.47)	214.09 (119.73)	0.999 (0.995, 1.002)	0.5494
Percent of money sent	52.6 (28.7)	51.7 (25.9)	0.999 (0.979, 1.019)	0.9224
Share number	4.1 (3.5)	6.1 (3.5)	1.16 (1.002, 1.349)	0.0947
Percentage of crops	15.6 (12.4)	14.2 (9.0)	0.99 (0.94, 1.04)	0.6919
People in house	13.4 (8.8)	12.8 (9.1)	0.993 (0.934, 1.055)	0.8458
People in room	12.3 (9.9)	11.0 (10.0)	0.99 (0.93, 1.04)	0.6786
Cost of ride	2.83 (1.86)	1.90 (0.15)	0.63 (0.21, 1.89)	0.4904
CATEGORICAL VARIABLES				
	Frequency N(%)			
Variable	**Among not hypertensive (N=50)**	**Among hypertensive (N=12)**	**Odds Ratio (90% CI)**	**P-value**
Male sex	43 (86.0%)	11 (91.7%)	1.79 (0.28, 11.32)	0.6033
Anemic	24 (53.3%)	2 (25.0%)	0.29 (0.07, 1.22)	0.1565
Blood glucose				
High	13 (28.3 %)	6 (66.7%)	>999.999 (<0.001, >999.999)	0.9520
Elevated	23 (50.0%)	3 (33.3%)	>999.999 (<0.001, >999.999)	0.9570
H2A	29 (58.0%)	7 (58.3%)	0.99 (0.34, 2.88)	0.9832
Speaks English	13 (26.0%)	1 (8.33%)	0.26 (0.04, 1.56)	0.2162
Amount English				
None	37 (74.0%)	11 (91.7%)	ref	
Little	12 (24.0%)	1 (8.3%)	0.28 (0.53, 1.70)	0.2459
Conversational	1 (2.0%)	0 (0.0%)	<0.001 (<0.001, >999.999)	0.9845
Method of payment				
Contract	21 (42.0%)	7 (58.3%)	ref	
Daily	1 (2.0%)	0 (0.0%)	<0.001 (<0.001, >999.999)	0.9764
Hourly	28 (56.0%)	4 (33.3%)	0.43 (0.14, 1.33)	0.2195
Unemployed	0 (0.0%)	1 (8.3%)	>999.999 (<0.001, >999.999)	0.9814
No ride to store	15 (30.0%)	6 (50.0%)	2.33 (0.80, 6.85)	0.1956
No fridge	11 (22.0%)	5 (41.7%)	2.53 (0.83, 7.72)	0.1704

No stove	12 (24.0%)	5 (41.7%)	2.26 (0.75, 6.84)	0.2250
Shares food	37 (74.0%)	12 (100.0%)	>999.999 (<0.001, >999.999)	0.9629
Does not eat crops	13 (26.0%)	3 (25.0%)	0.95 (0.28, 3.21)	0.9433
Has kids	34 (68.0%)	10 (83.3%)	2.35 (0.60, 9.24)	0.3036
Kids in GA	11 (22.0%)	1 (8.3%)	0.36 (0.06, 2.18)	0.6427
Lives with other farm workers in GA	39 (78.0%)	10 (83.3%)	1.41 (0.35, 5.67)	0.6848
Pays ride	8 (16.0%)	2 (16.7%)	1.05 (0.33, 3.33)	0.9472
Insecurity score				
Food secure	19 (38.0%)	2 (16.7%)	ref	
Food insecure without hunger	14 (28.0%)	6 (50.0%)	4.07 (0.94, 17.58)	0.1144
Food insecure with hunger, moderate	10 (20.0%)	2 (16.7%)	1.90 (0.33, 11.11)	0.5500
Food insecure with hunger, severe	7 (14.0%)	2 (16.7%)	2.71 (0.45, 16.39)	0.3611
Diversity score				
Low	5 (10.0%)	0 (0.0%)	<0.001 (<0.001, >999.999)	0.9651
Medium	27 (54.0%)	6 (50.0%)	0.67 (0.23, 1.95)	0.5344
High	18 (36.0%)	6 (50.0%)	Ref	
Food insecure	31 (62.0%)	10 (83.3%)	3.06 (0.79, 11.95)	0.1760
Low/medium diet diversity	32 (64.0%)	6 (50.0%)	0.56 (0.19, 1.63)	0.3747
High blood glucose	13 (28.3%)	6 (66.7%)	5.08 (1.41, 18.29)	0.0371
Overweight/obese	27 (54.0%)	8 (66.7%)	1.70 (0.56, 5.17)	0.4299

Table 8: Bivariate analyses of associations between independent variables and high blood glucose				
CONTINUOUS VARIABLES				
Variable	**Distribution mean (sd)**			
	Among not diabetic (N=36)	**Among diabetic (N=19)**	**Odds Ratio (90% CI)**	**P-value**
Age	30.1 (9.1)	38.1 (10.5)	1.09 (1.03, 1.14)	0.0092
SBP	122.2 (9.7)	126.1 (15.9)	1.03 (0.99, 1.07)	0.2671
DBP	77.2 (8.4)	77.4 (12.6)	1.00 (0.96, 1.05)	0.9482
Hemoglobin	13.9 (1.4)	13.9 (1.5)	1.03 (0.74, 1.42)	0.8999
Glucose	105.1 (10.3)	179.7 (89.4)	2.54 (0.88, 7.35)	0.1485
Height	63.9 (3.4)	63.3 (3.2)	0.95 (0.82, 1.09)	0.5241
Weight	149.0 (29.7)	151.8 (25.7)	1.00 (0.99, 1.02)	0.7199
BMI	25.7 (4.9)	26.8 (3.5)	1.06 (0.95, 1.18)	0.3761
School years	9.5 (3.1)	8.5 (2.5)	0.89 (0.75, 1.06)	0.2605
Times to US	4.0 (3.0)	4.6 (2.6)	1.08 (0.92, 1.27)	0.4507
Months in US	8.3 (3.0)	8.3 (3.0)	1.01 (0.86, 1.18)	0.9367
Months in GA	7.6 (3.2)	8.2 (3.2)	1.06 (0.91, 1.23)	0.5591
Frequency home	0.8 (0.6)	0.8 (0.4)	1.03 (0.43, 2.48)	0.9535
Months at home	3.5 (2.9)	3.6 (2.8)	1.01 (0.86, 1.20)	0.9155

Hours of work	9.2 (1.1)	9.5 (1.0)	1.33 (0.83, 2.12)	0.3151
Days of work	6.4 (0.7)	6.7 (0.4)	2.81 (1.08, 7.29)	0.0750
Money per week	418.81 (107.60)	436.58 (95.04)	1.002 (0.997, 1.006)	0.5398
Money kept	171.81 (84.42)	212.63 (112.60)	1.005 (0.999, 1.010)	0.1386
Money to family	247.00 (157.81)	223.95 (129.56)	0.999 (0.996, 1.002)	0.5797
Percent of money sent	53.9 (30.0)	50.1 (25.7)	0.995 (0.976, 1.015)	0.6342
Share number	3.9 (3.5)	5.5 (3.5)	1.14 (0.99, 1.30)	0.1190
Percentage of crops	14.0 (12.9)	15.3 (8.4)	1.01 (0.97, 1.05)	0.6895
People in house	13.6 (8.4)	14.2 (8.7)	1.01 (0.96, 1.07)	0.7818
People in room	12.2 (9.4)	13.2 (9.9)	1.01 (0.95, 1.07)	0.7263
Cost of ride	3.28 (1.91)	1.68 (0.63)	0.41 (0.13, 1.29)	0.2023
CATEGORICAL VARIABLES				
	Frequency N(%)			
Variable	**among not diabetic (N=36)**	**among diabetic (N=19)**	**Odds Ratio (90% CI)**	**P-value**
Male sex	34 (94.4%)	16 (84.2%)	0.31 (0.06, 1.53)	0.2281
Hypertensive	3 (8.3%)	6 (31.58%)	5.08 (1.41, 18.29)	0.0371
Anemic	17 (50.0%)	9 (47.4%)	0.90 (0.35, 2.31)	0.8542
H2A	19 (52.8%)	14 (73.7%)	0.40 (0.14, 1.10)	0.1378
Speaks English	10 (27.8%)	3 (15.8%)	0.49 (0.15, 1.62)	0.3257
Amount English				
None	26 (72.2%)	16 (84.2%)	ref	
Little	10 (27.8%)	2 (10.5%)	0.33 (0.08, 1.29)	0.1795
Conversational	0 (0.0%)	1 (5.3%)	>999.999 (<0.001, >999.999)	0.9864
Method of payment				
Contract	17 (47.2%)	8 (42.1%)	Ref	
Daily	0 (0.0%)	0 (0.0%)	n/a	n/a
Hourly	19 (52.8%)	11 (57.9%)	1.23 (0.48, 3.15)	0.7172
Unemployed	0 (0.0%)	0 (0.0%)	n/a	n/a
No ride to store	11 (30.6%)	8 (42.1%)	1.65 (0.63, 4.35)	0.3935
No fridge	9 (25.0%)	5 (26.3%)	1.07 (0.37, 3.11)	0.9152
No stove	10 (27.8%)	5 (26.3%)	0.93 (0.32, 2.66)	0.9078
Shares food	27 (75.0%)	17 (89.5%)	2.83 (0.71, 11.30)	0.2155
Does not eat crops	12 (33.3%)	4 (21.1%)	0.53 (0.18, 1.59)	0.3444
Has kids	24 (66.7%)	14 (73.7%)	1.40 (0.50, 3.94)	0.5931
Kids in GA	4 (11.1%)	5 (26.3%)	2.29 (0.64, 8.20)	0.5472
Lives with other farm workers in GA	30 (83.3%)	15 (79.0%)	0.75 (0.23, 2.45)	0.6890
Pays ride	6 (16.7%)	4 (21.1%)	1.33 (0.41, 4.35)	0.6890
Insecurity score				
Food secure	14 (38.9%)	3 (15.8%)	Ref	
Food insecure without hunger	9 (25.0%)	9 (47.4%)	4.67 (1.27, 17.17)	0.0517
Food insecure with hunger, moderate	8 (22.2%)	4 (21.1%)	2.33 (0.55, 9.97)	0.3373

Food insecure with hunger, severe	5 (13.9%)	3 (15.8%)	2.80 (0.57, 13.77)	0.2878
Diversity score				
Low	3 (8.3%)	1 (5.3%)	1.00 (0.08, 11.93)	1.0000
Medium	18 (50.0%)	13 (68.4%)	2.17 (0.63, 7.47)	0.2210
High	15 (41.7%)	5 (26.3%)	ref	
Food insecure	22 (61.1%)	16 (84.2%)	3.39 (1.05, 11.02)	0.0879
Low/medium diet diversity	21 (58.3%)	14 (73.7%)	2.00 (0.72, 5.56)	0.2644
Overweight/obese	17 (47.2%)	14 (73.7%)	3.13 (1.13, 8.66)	0.0652

Table 9: Bivariate analyses of associations between independent variables and overweight/obese

CONTINUOUS VARIABLES

	Distribution mean (sd)			
Variable	**Among not overweight/obese (N=27)**	**Among overweight/obese (N=35)**	**Odds Ratio (90% CI)**	**P-value**
Age	30.3 (9.4)	35.2 (10.6)	1.05 (1.01, 1.10)	0.0685
SBP	119.6 (13.0)	127.8 (11.8)	1.06 (1.02, 1.10)	0.0173
DBP	75.3 (8.6)	79.1 (10.7)	1.04 (0.996, 1.089)	0.1378
Hemoglobin	13.6 (1.2)	14.1 (1.6)	1.26 (0.91, 1.74)	0.2353
Glucose	125.5 (77.9)	135.1 (50.3)	1.00 (0.995, 1.011)	0.5936
School years	9.4 (3.4)	8.8 (2.5)	0.94 (0.81, 1.09)	0.4676
Times to US	5.3 (5.0)	4.5 (3.6)	0.96 (0.87, 1.06)	0.4801
Months in US	8.6 (3.0)	8.2 (2.9)	0.95 (0.82, 1.10)	0.5710
Months in GA	7.6 (3.2)	8.1 (3.1)	1.05 (0.91, 1.20)	0.5962
Frequency home	0.8 (0.7)	0.8 (0.4)	0.95 (0.43, 2.09)	0.9137
Months at home	3.3 (2.9)	3.7 (2.7)	1.05 (0.90, 1.23)	0.5732
Hours of work	9.3 (1.3)	9.5 (0.9)	1.15 (0.77, 1.72)	0.5605
Days of work	6.2 (0.8)	6.6 (0.4)	2.80 (1.31, 5.99)	0.0261
Money per week	405.44 (107.86)	435.74 (97.98)	1.003 (0.999, 1.007)	0.2523
Money kept	196.30 (82.08)	175.44 (98.97)	0.997 (0.993, 1.002)	0.3770
Money to family	209.15 (142.22)	260.29 (145.12)	1.003 (0.999, 1.006)	0.1718
Percent of money sent	46.7 (27.8)	57.0 (27.8)	1.013 (0.998, 1.029)	0.1585
Share number	4.7 (4.1)	4.3 (3.1)	0.97 (0.86, 1.09)	0.6408
Percentage of crops	11.9 (12.4)	18.1 (10.7)	1.053 (1.000, 1.099)	0.0459
People in house	13.1 (9.6)	13.4 (8.3)	1.04 (0.96, 1.05)	0.8975
People in room	11.7 (10.7)	12.3 (9.3)	1.006 (0.964, 1.051)	0.8067
Cost of ride	2.97 (1.93)	1.87 (0.56)	0.58 (0.22, 1.52)	0.3558

CATEGORICAL VARIABLES

	Frequency N(%)			
Variable	**among not overweight/obese (N=27)**	**among overweight/obese (N=35)**	**Odds Ratio (90% CI)**	**P-value**
Male sex	25 (92.6%)	29 (82.9%)	0.39 (0.09, 1.59)	0.2697

Hypertensive	4 (14.8%)	8 (22.9%)	1.70 (0.56, 5.27)	0.4299
Anemic	13 (56.5%)	13 (43.3%)	0.59 (0.23, 1.48)	0.3426
Blood glucose				
High	5 (20.8%)	14 (45.2%)	2.80 (0.73, 10.78)	0.2089
Elevated	14 (58.3%)	12 (38.7%)	0.86 (0.25, 2.92)	0.8360
H2A	10 (37.0%)	26 (74.3%)	0.20 (0.08, 0.51)	0.0042
Speaks English	4 (14.8%)	10 (28.6%)	2.30 (0.78, 6.79)	0.2058
Amount English				
None	23 (85.2%)	25 (71.4%)	Ref	
Little	4 (14.8%)	9 (25.7%)	2.07 (0.69, 6.20)	0.2752
Conversational	0 (0.0%)	1 (2.9%)	>999.999 (<0.001, >999.999)	0.9859
Method of payment				
Contract	13 (48.2%)	15 (42.9%)	Ref	
Daily	1 (3.7%)	0 (0.0%)	n/a	n/a
Hourly	13 (48.2%)	19 (54.3%)	1.23 (0.48, 3.15)	0.7172
Unemployed	0 (0.0%)	1 (2.9%)	n/a	n/a
No ride to store	12 (44.4%)	9 (25.7%)	0.43 (0.18, 1.07)	0.1259
No fridge	17 (63.0%)	6 (17.1%)	1.07 (0.37, 3.11)	0.9152
No stove	16 (59.3%)	6 (17.1%)	0.30 (0.09, 0.97)	0.0437
Shares food	20 (74.1%)	29 (82.9%)	1.69 (0.60, 4.75)	0.4023
Does not eat crops	12 (44.4%)	4 (11.4%)	0.16 (0.06, 0.48)	0.0055
Has kids	19 (70.4%)	25 (71.4%)	1.40 (0.50, 3.94)	0.5931
Kids in GA	5 (18.5%)	7 (20.0%)	1.38 (0.44, 4.27)	0.9856
Lives with other farm workers in GA	21 (77.8%)	28 (80.0%)	1.14 (0.41, 3.20)	0.8313
Pays ride	7 (25.9%)	3 (8.6%)	0.27 (0.08, 0.92)	0.0777
Insecurity score				
Food secure	9 (33.3%)	12 (34.3%)	Ref	
Food insecure without hunger	7 (25.9%)	13 (37.1%)	1.39 (0.48, 4.02)	0.6067
Food insecure with hunger, moderate	6 (22.2%)	6 (17.1%)	0.75 (0.23, 2.48)	0.6921
Food insecure with hunger, severe	5 (18.5%)	4 (11.4%)	0.60 (0.16, 2.25)	0.5246
Diversity score				
Low	3 (11.1%)	2 (5.7%)	0.56 (0.11, 2.93)	0.5672
Medium	13 (48.2%)	20 (57.1%)	1.30 (0.53, 3.18)	0.6271
High	11 (40.7%)	13 (37.1%)	Ref	
Food insecure	18 (66.7%)	23 (65.7%)	0.96 (0.39, 2.34)	0.9374
Low/medium diet diversity	16 (59.3%)	22 (62.9%)	1.16 (0.49, 2.76)	0.7731
High blood glucose (n=56)	5 (20.8%)	14 (45.2%)	3.13 (1.13, 8.66)	0.0652

Appendix C: Survey about eating habits and health (English and Spanish versions)

Part one: general information

Age _____ Height _____ Weight _____ Blood pressure _____/_____
Hemoglobin _____ Glucose _____ H-2A (yes/no) _____

1. Language
    a. What is your first/native language? _____
    b. How many years of school have you attended? _____
    c. Would you like to complete this questionnaire on your own? (yes/no) _____
    d. Do you speak English? (yes/no)
        i. If yes, would you say that you… (choose one)
            _____ know only a little English?
            _____ feel comfortable conversing in English?
            _____ are fluent?
2. Origin/travel to U.S.
    a. How long have you been in the U.S.? _____ years _____ months
    b. How often do you return to your home country? Every _____ months
    c. How many months in a year do you spend in the U.S.? _____ months
        i. How many of these months do you spend in Georgia? _____ months
    d. How many months in a year do you spend in your home country? _____ months
3. Work
    a. What kind of work do you do (i.e., with which crop(s) do you work?)
    _____
    b. How many hours a day do you work? _____ How many days per week? _____
    c. How are you paid? (choose one)
        _____Hourly
        _____Daily
        _____Based on units harvested
    d. How much money do you earn in a typical week?
        i. How much do you keep?
        ii. How much do you send home?
4. Access to food
    a. Do you regularly have access to transportation to stores to buy food? (yes/no) _____
    b. Do you regularly have access to a refrigerator? (yes/no) _____ A stove? (yes/no) _____
    c. Do you share food with other individuals? (yes/no) _____ If yes, how many? _____
    d. Do you eat any of the food you harvest in the fields? (yes/no) _____ If yes, how much?
    _____
5. Living conditions in Georgia
    a. Do you have children? (yes/no) ____ If yes, do they live with you here in Georgia? (yes/no) _____
    b. Do you live… (choose one)
        _____with family?
        _____alone?
        _____with other farmworkers?
    c. How many people live in the house where you reside? _____
    d. How many people sleep in the room where you sleep? _____
    e. Do you have to pay for transportation to work? (yes/no) _____ If yes, how much per day? $_____
    f. Do you have access to a working bathroom where you live? (yes/no) ____ Hand washing facilities? (yes/no) _____

Part two: USDA food insecurity questionnaire (Economic Research Service, 2008)

The food security status of each interviewed household is determined by the number of food-insecure conditions and behaviors the household reports. Households are classified as food secure if they report no food- insecure conditions or if they report only one or two food-insecure condi- tions. (Food-insecure conditions are indicated by responses of "often" or "sometimes" to questions 1-3 and 11-13; "almost every month" or "some months but not every month" to questions 5, 10, and 17; and "yes" to the other questions.) They are classified as food insecure if they report three or more food-insecure conditions

1. "We worried whether our food would run out before we got money to buy more." Was that often, sometimes, or never true for you in the last 12 months?
2. "The food that we bought just didn't last and we didn't have money to get more." Was that often, sometimes, or never true for you in the last 12 months?
3. "We couldn't afford to eat balanced meals." Was that often, sometimes, or never true for you in the last 12 months?
4. In the last 12 months, did you or other adults in the household ever cut the size of your meals or skip meals because there wasn't enough money for food? (Yes/No)
5. (If yes to question 4) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?
6. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food? (Yes/No)
7. In the last 12 months, were you ever hungry, but didn't eat, because there wasn't enough money for food? (Yes/No)
8. In the last 12 months, did you lose weight because there wasn't enough money for food? (Yes/No)
9. In the last 12 months did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food? (Yes/No)
10. (If yes to question 9) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?

(Questions 11-18 were asked only if the household included children age 0-18)

11. "We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food." Was that often, sometimes, or never true for you in the last 12 months?
12. "We couldn't feed our children a balanced meal, because we couldn't afford that." Was that often, sometimes, or never true for you in the last 12 months?
13. "The children were not eating enough because we just couldn't afford enough food." Was that often, sometimes, or never true for you in the last 12 months?
14. In the last 12 months, did you ever cut the size of any of the children's meals because there wasn't enough money for food? (Yes/No)
15. In the last 12 months, were the children ever hungry but you just couldn't afford more food? (Yes/No)
16. In the last 12 months, did any of the children ever skip a meal because there wasn't enough money for food? (Yes/No)
17. (If yes to question 16) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?

18 In the last 12 months did any of the children ever not eat for a whole day because there wasn't enough money for food? (Yes/No)

Part three: FAO dietary diversity questionnaire (FAO Nutrition and Consumer Protection Division, 2007)

DIETARY DIVERSITY QUESTIONNAIRE [1]

Please describe the foods (meals and snacks) that you ate yesterday during the day and night, whether at home or outside the home. Start with the first food eaten in the morning.

[Household level: consider foods eaten by any member of the household, and exclude foods purchased and eaten outside of the home]

Question number	Food group	Examples	YES=1 NO=0
1	CEREALS	bread, noodles, biscuits, cookies or any other foods made from millet, sorghum, maize, rice, wheat + *insert local foods e.g. ugali, nshima, porridge or pastes or other locally available grains*	
2	VITAMIN A RICH VEGETABLES AND TUBERS	pumpkin, carrots, squash, or sweet potatoes that are orange inside + *other locally available vitamin-A rich vegetables(e.g. sweet pepper)*	
3	WHITE TUBERS AND ROOTS	white potatoes, white yams, cassava, or foods made from roots.	
4	DARK GREEN LEAFY VEGETABLES	dark green/leafy vegetables, including wild ones + *locally available vitamin-A rich leaves such as cassava leaves etc.*	
5	OTHER VEGETABLES	other vegetables (e.g. tomato, onion, eggplant) , including wild vegetables	
6	VITAMIN A RICH FRUITS	ripe mangoes, cantaloupe, dried apricots, dried peaches + *other locally available vitamin A-rich fruits*	
7	OTHER FRUITS	other fruits, including wild fruits	
8	ORGAN MEAT (IRON-RICH)	liver, kidney, heart or other organ meats or blood-based foods	
9	FLESH MEATS	beef, pork, lamb, goat, rabbit, wild game, chicken, duck, or other birds	
10	EGGS		
11	FISH	fresh or dried fish or shellfish	
12	LEGUMES, NUTS AND SEEDS	beans, peas, lentils, nuts, seeds or foods made from these	
13	MILK AND MILK PRODUCTS	milk, cheese, yogurt or other milk products	
14	OILS AND FATS	oil, fats or butter added to food or used for cooking	
15	SWEETS	sugar, honey, sweetened soda or sugary foods such as chocolates, sweets or candies	
16	SPICES, CONDIMENTS, BEVERAGES	spices(black pepper, salt), condiments (soy sauce, hot sauce), coffee, tea, alcoholic beverages OR *local examples*	
			YES=1 NO=0
Individual level only	Did you eat anything (meal or snack) OUTSIDE of the home yesterday?		
Household level only	Did you or anyone in your household eat anything (meal or snack) OUTSIDE of the home yesterday?		

[1] *FAO/Nutrition and Consumer Protection Division, version of May, 2007. Please acknowledge FAO in any documents pertaining to use of this questionnaire.*

Sección uno: información básica

Edad _____ Estatura_____ Peso _____ Presión _____/_____
Hemoglobina _____ Glucosa _____ H-2A (sí/no) _____

1. La educación
    a. ¿Cuál es su idioma nativo? _____
    b. ¿Por cuántos años asistió a la escuela? _____
    c. ¿Le gustaría completar este cuestionario sin mi ayuda? (sí/no) _____
    d. ¿Habla inglés? (sí/no) _____
        i. Si habla inglés... (elija una sola respuesta)
            _____¿sabe solo un poco de inglés?
            _____¿se sienta cómodo conversando en inglés?
            _____¿es fluente en inglés?
2. Su origen
    a. ¿Por cuánto tiempo ha estado en los EE.UU.? _____ años _____ meses
    b. ¿Cuántos meses en el año pasa en los EE.UU.? _____ ¿Cuántos meses pasa en Georgia? _____
    c. ¿Con qué frecuencia vuelva a su país de origen? Cada _____ meses o _____ vez/veces por año
    d. ¿Cuántos meses en el año pasa en su país de origen? _____
3. El trabajo
    a. ¿Qué tipo de trabajo hace en Georgia? _____
    b. ¿Cuántas horas por día trabaja? _____ ¿Cuántos días por semana? _____
    c. ¿Cómo le pagan? (elija una respuesta)
        _____ por hora
        _____ por día
        _____según la cantidad que cosecha
    d. ¿Cuánto dinero gana usted en una semana típica? $_____
        i. ¿Cuánto dinero se guarda usted? $_____
        ii. ¿Cuánto dinero manda usted a la familia? $_____
4. Acceso a los alimentos
    a. ¿Tiene acceso regular a transportación a las tiendas para comprar alimentos? (sí/no) _____
    b. ¿Tiene acceso regular a un refrigerador? (sí/no) ____ ¿Una estufa? (sí/no) _____
    c. ¿Suele compartir los alimentos con otras personas? (sí/no) _____ ¿Con cuántas personas? _____
    d. ¿Come algunas comidas que cosecha en el campo? (sí/no) _____ ¿Qué porcentaje de su dieta es del campo? _____
5. Condiciones de la vida
    a. ¿Tiene hijos? (sí/no) _____ Si tiene hijos, viven ellos con usted aquí en Georgia? (sí/no) _____
    b. Aquí en Georgia… (elija una respuesta)
        ____¿vive con su familia?
        ____¿vive solo?
        ____¿vive con otros trabajadores agrícolas?
    c. Aquí en Georgia, ¿cuántas personas viven en la casa con usted? _____
    d. Aquí en Georgia, ¿cuántas personas duermen en el dormitorio con usted? _____
    e. Aquí en Georgia, ¿tiene que pagar para transportación al trabajo? (sí/no) _____ ¿Cuánto cuesta cada día? $_____
    f. Aquí en Georgia, ¿funciona el baño en su casa? (sí/no) _____ ¿Tiene acceso a un lavamanos y jabón? (sí/no) ____

Sección dos: La posibilidad de obtener alimentos

1. ¿Cuál de las siguientes oraciones describe mejor la situación de comida de usted en los últimos doce meses? **(MARQUE CON UN CÍRCULO <u>UNA SOLA</u> RESPUESTA)**
    a. Siempre como lo suficiente y los tipos de alimentos que deseo (CONTINUE A LA PREGUNTA 4)
    b. Como lo suficiente pero no siempre lo que deseo (CONTINUE A LA PREGUNTA 3)
    c. A veces, no como lo suficiente (CONTINUE A LA PREGUNTA 2)
    d. Frecuentemente no como lo suficiente (CONTINUE A LA PREGUENTA 2)

2. Aquí hay algunas razones por cual las personas no comen lo suficiente. Para cada una, indique si es una razón por la cual usted no come lo suficiente **(MARQUE <u>TODAS</u> LAS RESQUESTAS QUE DESCRIBEN USTED)**

Sí	No	No sé	
			No tengo suficiente dinero para comida
			Se me hace difícil ir a la tienda
			Estoy a dieta
			No tengo una estufa que funcione
			No puedo cocinar o comer debido a problemas de salud

CONTINUE A LA PREGUNTA 4

3. Aquí hay algunas razones por cual las personas no siempre tienen las clases de comida que quieren o necesitan. Para cada una, por favor indique si esa es una razón por qué no tiene las clases de comida que usted quiere o necesita **(MARQUE <u>TODAS</u> LAS RESQUESTAS QUE DESCRIBEN USTED)**

Sí	No	No sé	
			No tengo suficiente dinero para comida
			Se me hace difícil ir a la tienda
			Estoy a dieta
			No hay la clase de comida que quiero
			No hay buena calidad de comida

LAS SIGUIENTES PREGUNTAS REFIEREN A LOS ÚLTIMOS 12 MESES. PARA CADA, ELIJA <u>UNA SOLA</u> RESPUESTA.

4. "Me preocupó que la comida se podía acabar antes de tener dinero para comprar más." Para usted, esto fue…
    a. Frecuentemente
    b. A veces
    c. Nunca
    d. No sé
5. "La comida que compré no duró mucho y no había dinero para comprar más." Para usted, esto fue…
    a. Frecuentemente
    b. A veces
    c. Nunca
    d. No sé
6. "Yo no tenía lo suficiente para comer una comida balanceada (nutritiva)." Para usted, esto fue…
    a. Frecuentemente
    b. A veces
    c. Nunca
    d. No sé
7. "Dependía de unos pocos alimentos de bajo costo para dar comida a los niños porque se nos terminó el dinero disponible para comprar alimentos." Para usted, esto fue…
    a. Frecuentemente
    b. A veces
    c. Nunca

   d. No sé
8. “No tenía suficiente dinero para ofrecer una comida balanceada (nutritiva) a los niños. Para usted, esto fue…
   a. Frecuentemente
   b. A veces
   c. Nunca
   d. No sé
9. “Mi(s) hijo(s) no comía(n) lo suficiente porque no tenía dinero para comprar suficiente comida. Para usted, esto fue…
   a. Frecuentemente
   b. A veces
   c. Nunca
   d. No sé
10. En los últimos 12 meses, desde el último junio, ¿usted menos o dejó de comer porque no había suficiente dinero para la comida?
   a. Sí (CONTINUE A LA PREGUNTA 11)
   b. No (CONTINUE A LA PREGUNTA 12)
   c. No sé (CONTINUE A LA PREGUNTA 12)
11. ¿Con qué frecuencia sucedió esto?
   a. Casi cada mes
   b. Algunos meses
   c. Solo en uno o dos meses
   d. No sé
12. En los últimos 12 meses, ¿comió usted menos de lo que pensaba que debía porque no hubo suficiente dinero para comida?
   a. Sí
   b. No
   c. No sé
13. En los últimos 12 meses, ¿alguna vez tuvo hambre pero no comió porque no tuvo suficiente dinero para comida?
   a. Sí
   b. No
   c. No sé
14. En los últimos 12 meses, ¿perdió usted peso porque no tuvo suficiente dinero para comprar comida?
   a. Sí
   b. No
   c. No sé
15. En los últimos 12 meses, ¿usted no comió por todo el día porque no hubo suficiente dinero para comida?
   a. Sí (CONTINUE A LA PREGUNTA 16)
   b. No (CONTINUE A LA PREGUNTA 17)
   c. No sé (CONTINUE A LA PREGUNTA 17)
16. ¿Con qué frecuencia sucedió esto?
   a. Casi cada mes
   b. Algunos meses
   c. Solo en uno o dos meses
   d. No sé
17. En los últimos 12 meses, ¿alguna vez le dio menos cantidad de comida a su(s) hijo(s) porque no hubo suficiente dinero para comida?
   a. Sí
   b. No
   c. No sé
18. En los últimos 12 meses, ¿alguna vez su hijo o cualquiera de sus hijos no comió porque no hubo suficiente dinero para comida?
   a. Sí (CONTINUE A LA PREGUNTA 19)

b. No (CONTINUE A LA PREGUNTA 20)
c. No sé (CONTINUE A LA PREGUNTA 20)

19. ¿Con qué frecuencia sucedió esto?
    a. Casi cada mes
    b. Algunos meses
    c. Solo en uno o dos meses
    d. No sé
20. En los últimos 12 meses, ¿alguna vez su hijo o cualquiera de sus hijos tuvo hambre pero no tuvo suficiente dinero para comprar más comida?
    a. Sí
    b. No
    c. No sé
21. En los últimos 12 meses, ¿alguna vez sus hijos no comieron por todo el día porque no hubo suficiente dinero para comida?
    a. Sí
    b. No
    c. No sé

Sección tres: Cuestionario de la diversidad alimentaria

Por favor, describa <u>todas</u> las comidas (incluyendo las meriendas) que comió usted <u>ayer durante el día y la noche</u>. Empiece con la primera comida que comió por la mañana.

Pregunta	**Grupo de comida**	**Ejemplos**	**Sí = 1 No = 0**
1	Cereales y alimentos básicos	Papas, pan, tortillas, fideos, galletas, o otras comidas del mijo, sorgo, maíz, arroz, o trigo	
2	Hortalizas y tubérculos ricos en vitamina A	Calabazas, zanahorias, camotes, pimientos	
3	Raíces blancas y tubérculos	ñames blancos, yucas, o otras comidas de raíces	
4	Hortalizas de hoja verde	Espinaca, col rizada	
5	Otras hortalizas	Tomates, cebollas, berenjenas y otras hortalizas	
6	Frutas ricas en vitamina A	Mangos maduros, melones, albaricoques secos, melocotones secos	
7	Otras frutas	Otras frutas (manzanas, uvas, naranjas, bananos)	
8	Carne de órganos	Hígado, riñón, corazón, o otras carnes de órganos	
9	Otro carne	Carne de vaca, cerdo, cordero, cabra, conejo, caza, pollo, pato, o otras aves	
10	Huevos		
11	Pescado y marisco	Pescado fresco o seco, marisco	
12	Legumbres y frutos secos	Frijoles, guisantes, lentejas, nueces, frutos secos, o otros alimentos de estas cosas	
13	Leche y productos lácteos	Leche, queso, yogur, u otros productos lácteos	
14	Aceites y grasas	Aceites, grasas, o mantequilla añadida o usada para cocinar	
15	Meriendas con sal	Chicharrones, papas fritas, “Cheetos,” “Fritos”	
16	Meriendas dulces	Azúcar, miel, o alimentos como chocolates, dulces, o caramelos	
17	Bebidas dulces	Refrescos con azúcar, Jarritos y otras sodas, jugo	
18	Especias, condimentos, y bebidas con cafeína o alcohol	Especias (pimienta, sal), condimentos (salsa picante), café, té, bebidas alcohólicas	

Appendix D: Focus group discussion guide (English and Spanish versions)

Food security and healthy eating among farm working families in southwest GA

Welcome

Thank you all for coming to our focus group discussion. My name is Charlotte Sibley, and [name redacted] will be assisting me today.

This summer, I am conducting research on food access, diet, and health in the farm worker community in southwest Georgia. I have already conducted interviews with others to learn more about their personal experiences with these issues, but discussing these topics in a group will give a broader perspective on how food security and diet diversity influence the farm worker community as a whole. We value everyone's opinions and input today, because we want to learn as much as possible about food and health issues in the whole community.

I would like to explain how we want to conduct the discussion. First we want to reassure you that your participation in this project is confidential. Everything we discuss will be kept confidential and will only be used for this research project. We will not share your information with anyone outside of this project. When we write up our report we will not use your real name and we will also remove any information that might reveal who you are. Second, your participation in the focus group is voluntary. You may leave at any time, if you wish and only answer those questions you are comfortable answering. However, please also keep in mind that we value every participant's ideas and opinions.

We encourage all of you to share your thoughts throughout the discussion, and we also ask you to respect the opinions of others. You do not need permission to speak, but we do ask that only one person speak at a time so that each comment can be heard. We will be taking notes during the discussion, but with your permission we would also like to record our conversation. This recording will ensure that we do not miss what is said or forget any important comments when we are reviewing the discussion later. Please know that the recording will only be used for this research project and only the people involved in this project will be able to listen to it. Only your first name will be used in the recording, and your name will be removed from any written record we make of the recording. Does everyone agree to let us record the discussion? (Wait for everyone to give consent.) The discussion will probably last about one hour; please make your selves comfortable and note that the restroom is located in the hallway outside this room. Are there any questions?

Introductions

To begin, let's take turns introducing ourselves (first names only). Please also tell us if you have children and what type of work you do (if you work).

What do you think is the greatest health concern for people in the farm working community in this part of Georgia? (Make a list.)

Topic 1: What are the priorities of women in the farm worker community?

1. 10 seed method
    a. (Give each woman 10 pennies.) Think of all the things TWC spend their money on in a one-month period. Separate your pennies into piles according to how much of her money a TWC would allocate to: housing/rent, utilities, transportation, food from stores, food from restaurants, clothing, and health care. (Have a few volunteers explain why they divided their pennies the way they did.)
    b. Let's start over with our 10 pennies and just think about food this time. Please separate your pennies based on how much of her money (in a one-month period) a TWC spends on: packaged/ready-to-eat snacks and soda, fresh fruits and vegetables, meat and dairy products, canned/frozen foods, and grains (like bread and cereal). (Have a few volunteers explain why they divided their pennies the way they did.)
2. Let's think about the evening meal during the school week. What is a typical meal during a school week? How frequently do TWC prepare foods from scratch for evening meals? How frequently do they purchase foods from a restaurant or fast food place? Why is this done? Which would women in your community prefer to do?
    a. Discuss the factors that are involved in making this decision.

Topic 2: What foods are considered healthy in your community?

3. What are some examples of foods a TWC would consider to be healthy for her and her family?
    a. Why are these foods considered healthy?
    b. Please describe any differences in opinion in the community about what foods are healthy.
    c. Why do you think such differences in opinion exist?
4. What kinds of foods do children in your community like to eat?
    a. Why are these foods appealing to children?
5. Think about female friends or family members you have who live in Mexico or other countries outside the U.S. What types of foods do these women consider to be healthy?

Topic 3: How accessible are healthy foods for TWC?

I would now like to talk about women's access to food and healthy eating in this community.

6. Where do TWC get most of the food for their households?

   a. Are there places they would prefer to go but don't? Why don't TWC go to those places?
   b. Are there certain places TWC go for certain foods (i.e., tortillas, vegetables, etc.) Why do they go to these places?
   c. Where can women in this community get fresh fruits and vegetables for their families? Are these accessible (in terms of cost, transport)?

7. What are some of the obstacles a TWC might face when trying to provide healthy food for her family?
   a. What roles do convenience, transportation, and preferences of other family members (including children) play in a TWC's attempts to provide healthy food?
   b. How do TWC overcome these challenges?

Topic 4: Making healthy changes

8. If a TWC wants her family to eat healthier, what help is available?
   a. What services have you heard about that help people in your community eat healthier?
   b. What types of services do you wish were available to help people eat healthier?

Conclusion

It is almost time for us to conclude our discussion. Does anyone want to add any additional comments? Would anyone like to reiterate or challenge any of the major points that were made today? Thank you all for participating in our discussion. We really appreciate your input. We will now give out gift cards to compensate you for your time. Please make sure you sign the sheet to indicate you received a gift card.

La alimentación saludable entre las agrícolas migrantes y sus familias en el sur de Georgia

Bienvenidos y introducción

Muchas gracias a todos por venir a la clínica para participar en esta discusión. Me llamo Charlotte Sibley, y [name redacted] va a ayudarme hoy.

Este verano, yo estoy estudiando el acceso a los alimentos, la dieta, y la salud de las personas en la comunidad de agrícolas y sus familias aquí en el sur de Georgia. Ya he conducido entrevistas con otras personas para aprender sobre sus experiencias individuales, pero creo que discutiendo estos temas en un grupo nos dará más información sobre los papeles del acceso a los alimentos y la dieta en las vidas de las personas en esta comunidad. Nos interesan todas opiniones hoy, porque quiero aprender tanto como sea posible sobre sus experiencias.

Voy a explicar la manera en la que quiero llevar a cabo la discusión. En primer lugar, quiero asegurarles que su participación es confidencial. Todas nuestras discusiones son confidenciales, y sólo se utilizará para este proyecto. No voy a compartir su información con nadie fuera de mi proyecto. Cuando escribo mi informe, no voy a usar sus nombres reales, y voy a eliminar cualquier información que pudiera revelar sus identidades. En segundo lugar, su participación en esta discusión es voluntaria. Si alguna pregunta le hace sentir incomoda, no tiene que responder, y si quiere, puede salir en cualquier momento. Sin embargo, recuerde que las ideas y opiniones de cada participante son importantes.

Animo a todos a compartir sus pensamientos durante la discusión, y también les pido que respeten las opiniones de los demás. No necesita permiso para hablar, pero les pido que solo una persona hable a la vez para que podamos escuchar todos los comentarios. Voy a tomar notas durante la discusión, per, con su permiso, me gustaría grabar la conversación. Esta grabación se asegurará de que no se pierda ningún comentario importante cuando repaso la discusión en el futuro. Solo voy a usar la grabación para mi estudio académico, y nadie más lo escuchará. No vamos a usar los apellidos en la grabación, y en mi informe escrito, voy a cambiar sus nombres a nombres falsos para proteger su confidencialidad. Entonces, ¿puedo grabar la discusión? (…espera…) La discusión va a durar aproximadamente una hora. Por favor, pónganse cómodas. Si lo necesita, hay un baño en el pasillo fuera de esta sala.

Las presentaciones de las personas

Para empezar, vamos a presentarnos en el grupo (pero no use su apellido). Por favor, díganos si tiene hijos y que tipo de trabajo hace (o si trabaja en la casa).

¿Qué cree es el problema de salud más importante en su comunidad? (Haga una lista.)

Tema 1: ¿Cuáles so las prioridades de las mujeres en esta comunidad?

1. Una simulación con 10 centavos
    a. (Distribuya 10 centavos a cada mujer.) Consideren todas las cosas que mujeres en su comunidad compran en un mes. Por favor, separen los centavos en pilas según la cantidad de dinero que una mujer usaría para: el alquiler, las facturas, la transportación, los alimentos de tiendas, los alimentos de restaurantes, la ropa, y la atención médica. Por favor, ¿será voluntario explique por qué dividió los centavos en las pilas especificas? Otro voluntario?
    b. Vamos a empezar otra vez con los 10 centavos. Esta vez, sólo piensen en la comida/los alimentos que compra una mujer en su comunidad en una mes. Por favor, separe los centavos según la cantidad de dinero una mujer gasta en: las meriendas envasadas y los refrescos (por ejemplo, Coke, Pepsi), las frutas y verduras frescas, el carne y los productos lácteos, alimentos enlatados o congelados, y el pan/los cereales. ¿Un voluntario para explicar sus decisiones con los centavos?
2. Por favor, piensen en las cenas durante la semana escolar. ¿Qué es una cena típica durante la semana escolar?
    a. ¿Para una mujer típica en su comunidad, con qué frecuencia prepara la cena de cero? ¿Con qué frecuencia compra la cena de un restaurante o de una tienda de comida rápida? ¿Por qué hace ella esto?
    b. ¿Cuál es la opción preferible para ella? ¿Por qué?

Tema 2: ¿Cuáles alimentos se consideran saludables en su comunidad?

3. ¿Qué son algunos ejemplos de alimentos que una mujer en su comunidad considera saludable?
    a. ¿Por qué son estos alimentos considerados saludables?
    b. ¿Hay diferentes opiniones sobre cuales alimentos son saludables en sus comunidades? Describan estas diferencias.
    c. ¿En su opinión, por qué existe estas opiniones diferentes?
4. A los niños en su comunidad, ¿qué tipos de alimentos les gustan?
    a. ¿Por qué los niños disfrutan de estos alimentos?
5. Por favor, consideran amigas o mujeres en su familia que viven en México o otros países fuera de los EE.UU. ¿Qué tipos de alimentos se consideran saludables?

Tema 3: El acceso a los alimentos saludables

6. Para una mujer típica en su comunidad, ¿dónde compra la mayoría de los alimentos para la familia?
    a. ¿Hay lugares donde le gustaría ir, pero no va? ¿Por qué no va a estos lugares?
    b. ¿Hay lugares donde va para alimentos específicos, como vegetables, meriendas, tortillas, etc.)? ¿Por qué va a estos lugares?

   c. ¿Dónde puede comprar frutas y verduras frescas para su familia? Considerando el costo y cosas como la transportación, es fácil o difícil comprar frutas y verduras frescas?
7. ¿Cuáles son algunos de los obstáculos que una mujer en su comunidad puede surgir cuando se trata de ofrecer alimentos saludables a su familia?
   a. ¿Qué son los efectos de la transportación, la conveniencia, y las preferencias de otros miembros de la familia (incluyendo los niños) en los intentos de una mujer para ofrecer comida saludable a la familia?
   b. ¿Cómo puede superar estos desafíos?

Tema 4: Hacer cambios saludables

8. Si una mujer en su comunidad quiere que su familia coma comidas más saludables, que puede hacer?
   a. ¿Qué servicios existe en la comunidad para ayudar a las personas comer alimentos más saludables?
   b. A ustedes, ¿qué servicios les gustarían en la comunidad para ayudar a las personas comer alimentos más saludables?

Conclusión

Es casi la hora para concluir nuestra discusión. ¿Alguien quiere añadir algún comentario adicional? ¿Alguien quiere reiterar o desafío alguno de los puntos que se discutimos hoy?

Muchas gracias por su participación. Voy a darle a cada uno de ustedes una tarjeta de regalo para compensarle por su tiempo. Por favor, asegúrese de firmar la hoja para indicar que recibió una tarjeta de regalo.