Food Security in Colonias of Hidalgo County, Texas: A Needs Assessment Analysis

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Abstract

Background:

Colonias in Hidalgo County, Texas are residential communities near the Texas-Mexico border which often lack basic living necessities with high rates of poverty. Due to complex socioeconomic/geopolitical stressors (factors ranging from income inequality to access to transportation to concern regarding safety and legal status), colonias have limited availability to fresh produce, while processed foods are more readily available, resulting in significant food insecurity.

Objectives:

The aims of this study are to assess levels of food insecurity, current eating habits, barriers of access, and interest in more readily affordable and accessible produce options in colonias of Hidalgo County, Texas. We hypothesize that residents of the colonias indeed have limited access to fresh produce and healthy food options and that there is interest within the population for more readily affordable and accessible produce options.

Methods:

This study included an extensive literature review on known food insecurity and barriers to access to fresh produce in the colonias. We then surveyed 80 individuals within four colonias of Hidalgo County with health promoters from *Proyecto Azteca*, a program with established presences and trust within the community. The survey gathered anonymous data including respondent demographics, current food habits, barriers of access to fruits/vegetables, and interest in augmentation of access to fresh produce. We, furthermore, utilized geospatial analysis to map current locations of food sources in relation to the four colonias surveyed.

Results:

Overall, we identified high rates of food insecurity (82.5% identified as food insecure), difficulty with many barriers of access to fresh produce (including transportation, cost, taste, and lack of knowledge about preparation), and high levels of interest in increasing fruit/vegetable consumption if there were more affordable (95%) and convenient (92.5%) options to purchase fresh produce. Furthermore, 23.8% of respondents admitted to feeling fearful of traveling outside of their colonia, the majority of whom identified immigration enforcement as their principle fear. Fear was significantly associated with screening positive for food insecurity ($p < 0.05$).

Conclusion:

This study not only demonstrates many of the impediments to accessing fresh, healthful, affordable produce, but it also highlights some of the major effects of these barriers--especially the alarmingly high rate of food insecurity. It also identifies fear of leaving one's colonia (especially fear of immigration enforcement) as significantly associated with food insecurity.

Background:

Colonias & Poverty:

According to the Texas Secretary of State, a colonia is defined as “a residential area along the Texas-Mexico border that may lack some of the most basic living necessities, such as potable water and sewer systems, electricity, paved roads, and safe and sanitary housing” (Texas Secretary of State 2017). Texas is home to 2200 colonias, and 1200 of those colonias are in Hidalgo County (Texas Secretary of State 2017). Hidalgo County colonias have been known to exhibit persistent poverty (Dean *et al* 2011). Neighborhoods in Hidalgo County have been assessed using the Neighborhood Socioeconomic Deprivation Index, which compounds unemployment, poverty, low education attainment, housing crowding, public assistance, vehicle availability, and telephone service. 61% of Texas colonias assessed were considered high deprivation (Sharkey *et al* 2010). Poverty is multi-factorial and is intimately linked with concerns about food security.

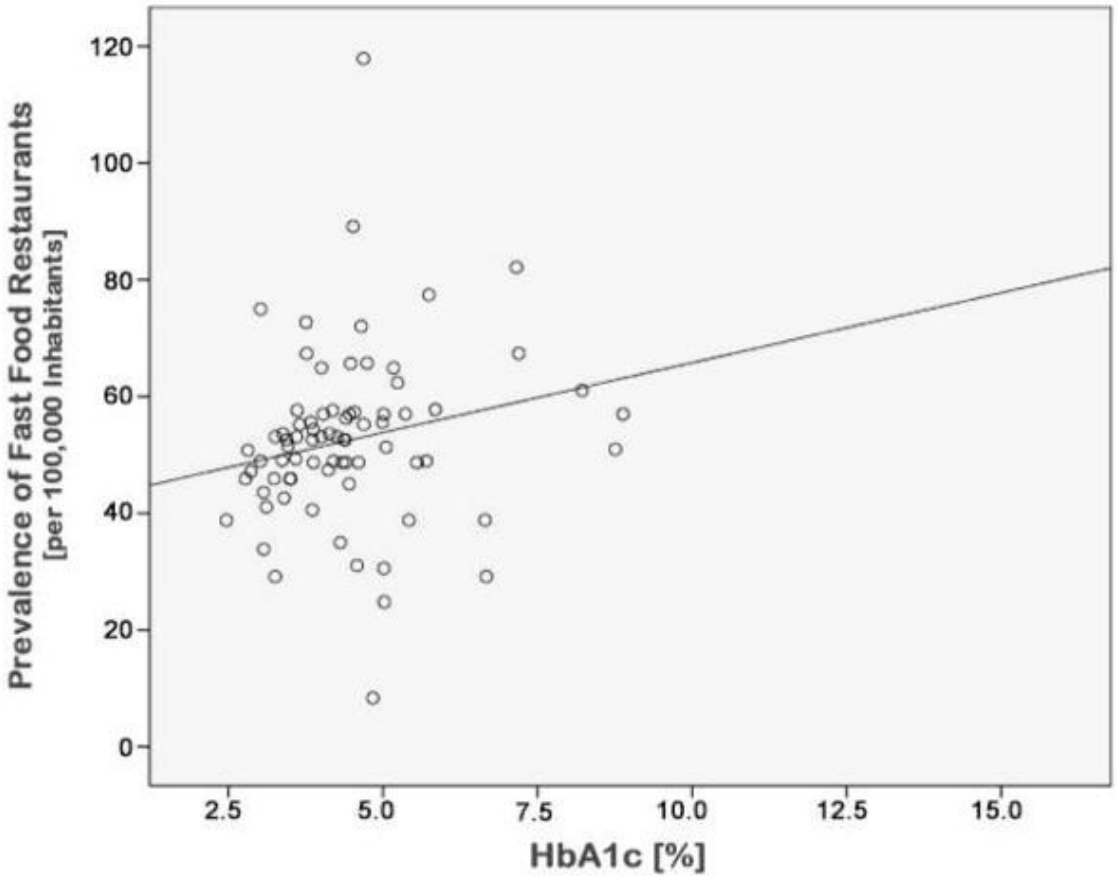
Known Food Insecurity & Hunger in Colonias:

Food insecurity is defined by the USDA as “reduced quality, variety, or desirability of diet” which, in cases of very low food security, results in “disrupted eating patterns and reduced food intake” (USDA 2017). Half of all children in colonias have been identified as food insecure in the past (Sharkey *et al* 2009) (Sharkey *et al* 2005). More recent studies of mother-child dyads in South Texas colonias demonstrated that 80% of mothers reported household food insecurity, while 64% of their children reported food insecurity (Nalty *et al* 2013). Further studies demonstrated that, in addition to high rates of food insecurity, 51% of children in the colonias reported childhood hunger (Sharkey *et al* 2013). Reports of hunger were associated with Mexican nativity, reliance on school-based programs, parental unemployment, and number of people living in the home (Sharkey *et al* 2013). Clearly, access to food and adequate nutrition represents severe concern not only for parents, but children are often acutely aware of concerns regarding access to food. Food insecurity is also associated with poorer nutritional content, including percentage of calories taken from fat and sugar (Sharkey *et al* 2012). In order to remedy this, it is important that food resources are “accessible...available...and affordable” (Sharkey *et al* 2005). Food insecurity results in profound effects on multiple family risk factors, including financial strain, maternal poor health, family disruption and conflict, and parenting disruption (Hernandez *et al* 2014).

Malnutrition in Colonias:

Malnutrition includes both undernutrition and overweight, obesity, and diet-related diseases (WHO 2017). Overall, it reflects inadequate and imbalanced intake of recommended daily macronutrients and micronutrients. Obesity, a form of malnutrition and concerning trend for all Americans, has been especially associated with areas with poorer access to supermarkets and higher number of convenience stores (Sharkey *et al* 2009). Furthermore, access to poor quality food has been associated with poor health outcomes; in one study, prevalence of fast food restaurants was associated with increased risk of gestational diabetes (see Figure below from Kahr *et al* 2016). colonia residents have been shown to consume fewer than recommended daily intake of fruits and vegetables. In one study, women consumed approximately 1.5 servings

of fruit and 2.2 servings of vegetables per day, while men consume about 1.3 servings of fruit and 2.1 servings of vegetables per day (Sharkey *et al* 2010). USDA recommends 2 cups of fruit and 2.5 cups of vegetables in daily diets (one serving size equals 0.5 cup cooked or 1 cup raw fruits or vegetables) (USDA 2017).



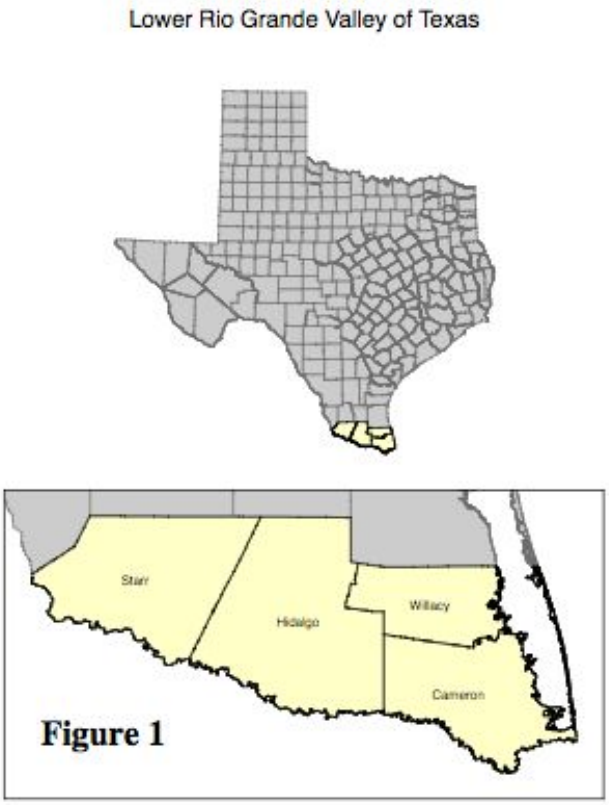
(Kahr *et al* 2016).

Access to Food Sources in Colonias:

"Food desert" is a term used to describe areas with limited access to nutritious foods (Sharkey *et al* 2010), and this category applies to many colonias, not only because of physical distance from food sources, but also because of difficulty with transportation. Residents of colonias have several common sources of food and groceries, ranging from grocery stores such as H.E.B., to dollar stores, to flea markets (known as *La Pulga*), to convenience stores, to home markets (ie a family selling candy and pre-packaged food out of their home) (Valdez *et al 2012*), to chain stores like Wal-Mart and Target. Dollar stores have increasingly become a source of food, although the quality of this food can vary (Sharkey *et al* 2010). A major concern is that access to supercenters and supermarkets, where there is a large selection of affordable and healthy options, is poor for many colonias (Sharkey 2009), especially because proximity to supermarkets has been associated with increased intake of fruits of vegetables, regardless of socioeconomic status (Dean *et al* 2011) (Sharkey *et al* 2005). (Sharkey *et al* 2010). In one survey of senior citizens living in colonias of Hidalgo County, median distance to nearest

grocery store was 8.7 miles, median distance to fresh fruit was 5.5 miles, and median distance to fresh vegetables was 6.4 miles. In that study, 80% of seniors reported that prices were too high at community food sources (Sharkey *et al* 2010). A major impediment to accessing any food sources is lack of public transportation -- in assessment of colonias, regular public transportation services were not available (Sharkey *et al* 2010). Average distance to markets and food stores were also assessed in colonias; they were found that rural neighborhoods were on average 9.9 miles to nearest supermarket, and about 7 miles from nearest source of fresh fruits/vegetables, and about 5 miles from processed fruits/vegetables (Sharkey *et al* 2010). Pharmacies and dollar stores do often carry at least canned fruits and vegetables, although convenience stores are less likely to carry canned fruit/vegetable products. Interestingly, canned and frozen fruits and vegetables are comparable nutritionally to fresh fruits and vegetables (Sharkey *et al* 2010).

Prior Maps of Hidalgo County and Food Access (Sharkey *et al* 2005):
Below are maps developed by Sharkey *et al*, published in 2005, which demonstrate location of colonias as well as location of food sources in Hidalgo County.



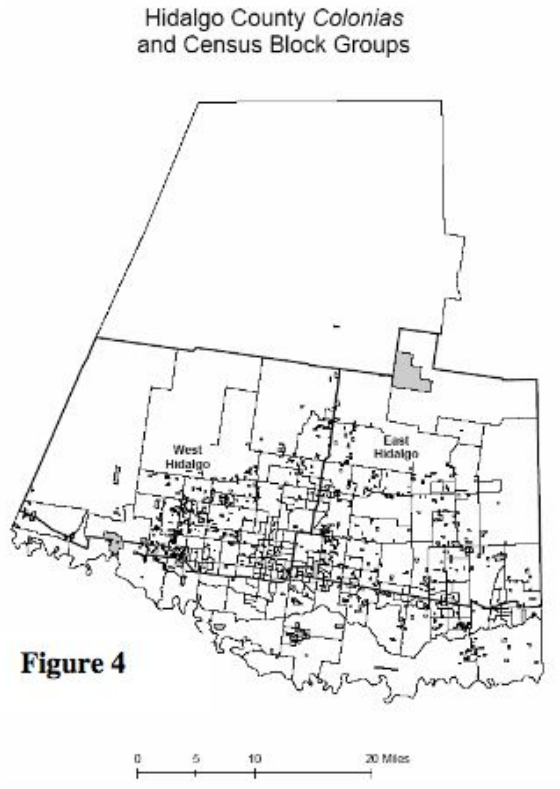


Figure 4

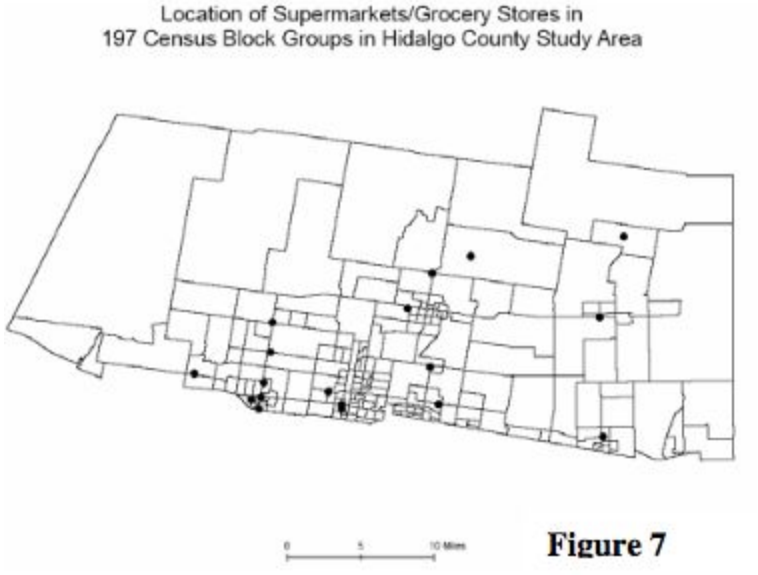


Figure 7

Location of Convenience Stores in
197 Census Block Groups in Hidalgo County Study Area

Figure 8

Location of Fast Food Restaurants
in 197 Census Block Groups in Hidalgo County Study Area

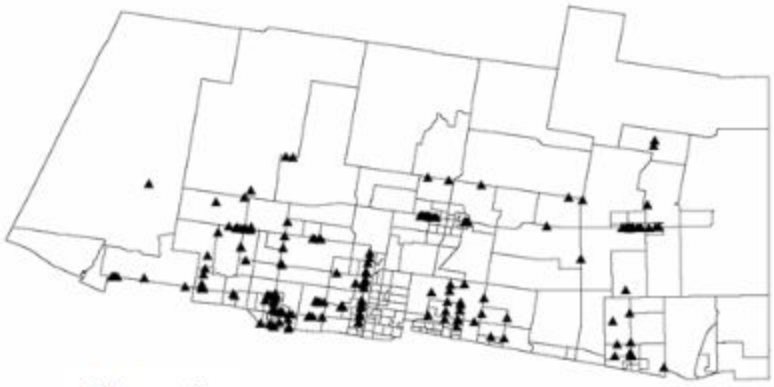
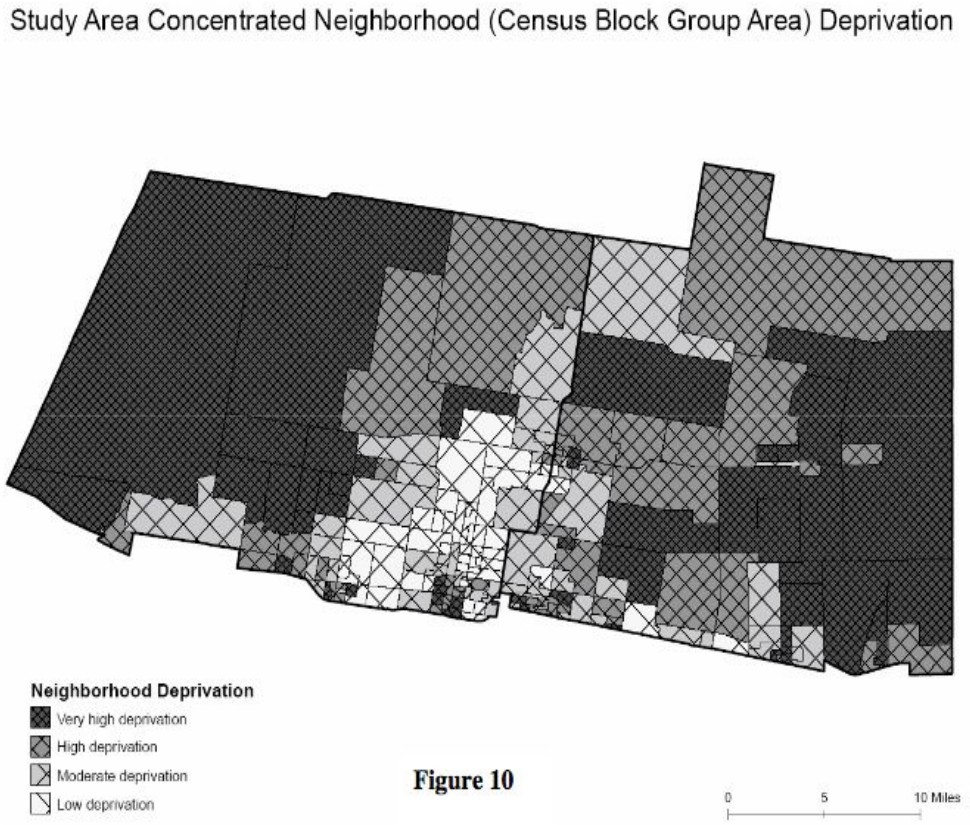


Figure 9



(Sharkey *et al* 2005)

Effectiveness of previous efforts to increase affordability and availability of fruits and vegetables:

Poor access and decreased ability to afford fresh produce have long been concerns in low-income neighborhoods. Previous efforts to address this issue have utilized 'mobile markets' as an avenue to bring subsidized produce directly to low-income neighborhoods.

A major limitation of studies of fresh-food initiatives, including mobile markets and coupon programs, is that they often involve unreliable methods, including cross-sectional surveys and observational studies. However, results are promising for some positive effects, although future studies are needed in this area of active investigation (McCormick *et al* 2010).

One review assessed over 16 studies of initiatives to expand access to fresh produce. Significant results included assessment of WIC farmer's market coupons. Those who received coupons reported increased consumption of fruits and vegetables and a greater likelihood to return to the farmer's market in the future, even without coupons. They also reported that they had learned new ways to prepare fruits and vegetables at the market. In addition, 90% of farmers reported increase in sales secondary to these coupons (McCormick *et al* 2010).

An additional observational study by the CDC assessed a mobile market placed outside of an elementary school and found that each day that this mobile market was present, the vendor sold an increasing amount of fruits and vegetables, while a competitor sold less non-nutritious food daily (Tester *et al* 2012).

A study by Gorham *et al* looked at Fresh to You, a public-private partnership to bring discount fresh produce to low-income communities in Rhode Island. These markets were held weekly for 5 months and sold produce at below-retail prices at six different venues located in low-income census tracts. Each market lasted two hours, offered 23 different produce types, and attracted ~37 shoppers, making $306 in sales each week. The parents of children from three to thirteen years of age were recruited for this cohort study. By the end of this five month study, the researchers reported a half-cup increase daily in fruit/vegetable consumption. Focus group interviews revealed that the parents appreciated the increased access, affordability and high quality fruits and vegetables that Fresh to You provided (Gorham *et al* 2015).

A review of behavioral interventions to promote fresh produce intake showed that behavior-based interventions increased fresh fruit and vegetable intake by 1.13 serving sizes per day. When the study was further divided, the average increase in fruit/vegetable intake in low-income and minority populations was 0.97 servings per day. Though this is still a significant increase, there is a gap based on socioeconomic status. This study concluded that the cost of fresh produce could be prohibitive for increased consumption in low-income populations (Thomson *et al* 2011).

Hypothesis:

Due to complex socioeconomic/geopolitical stressors (factors ranging from income inequality to access to transportation to concern regarding safety and legal status), colonias have limited availability to fresh produce, while processed foods are more readily available.

We hypothesize that residents of the colonias in Hidalgo County, Texas indeed have limited access to fresh produce and healthy food options as a consequence of the aforementioned barriers.

Furthermore, we hypothesize that there is interest within the population for more readily affordable and accessible produce options.

Methods:

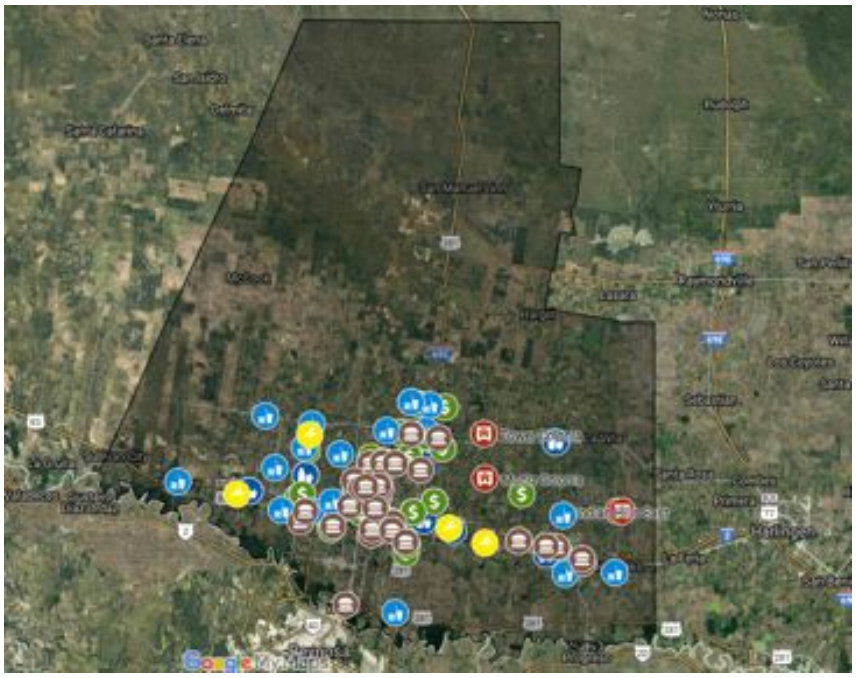
In this study, we utilized a door-to-door survey to assess current eating habits, barriers to access to nutritious foods, and interest in change in foods. Health promoters who are known in the colonias helped to survey one member per household in three colonias in Hidalgo County -- Indian Hills East, Indian Hills West, Muñiz, and South Tower Colonias. Survey respondents were given the opportunity to opt in or out of the survey at any time. Some also consented to allow a photograph to be taken of their refrigerator. Over the course of four separate days, 80 surveys were collected. An attempt was made to randomize survey collection, but due to dogs in the community, survey respondents were selected based on availability outside their home (to protect surveyors from attack dogs). Additionally, google mapping software was utilized to visually evaluate distance of these colonias to various food sources.

Results:

Geography of Hidalgo County an Colonias:

Using google mapping software, an interactive map was created to assess proximity of colonias surveyed to grocery stores, dollar stores, convenience stores, flea markets (*las pulgas*), and fast food restaurants. A composite image of this map is located below in map 1, which is also a hyperlink to the map in the online version of this manuscript. The full link can be seen in the bibliography at the end of this report (Google Maps, 2017).

Map 1:



Demographics of Respondents:

Of the 80 survey respondents, 34.6% were from Tower Colonias, 30.0% were from Indian Hills East Colonia, 14.8% were from Indian Hills West Colonia, and 19.8% were from Muñiz Colonia (Figure 1). 85% of respondents were female and 15% were male (Figure 2). All were over 18 years of age, and median age was 44.5 years (average was 48 years). Age range of respondents was 19-90 years. 100% of respondents identified as Hispanic. Average household size was 4.7 people per household, and median household size was 4 people per household (Figure 3). On average, there were 2.1 (median 2.0) individuals under 18 per household, with a range of 0-7 minors per household (Figure 4). The majority of respondents (91.3%) preferred Spanish over English (Figure 5).

Figure 1: Colonia of Origin of Respondent (n=80)

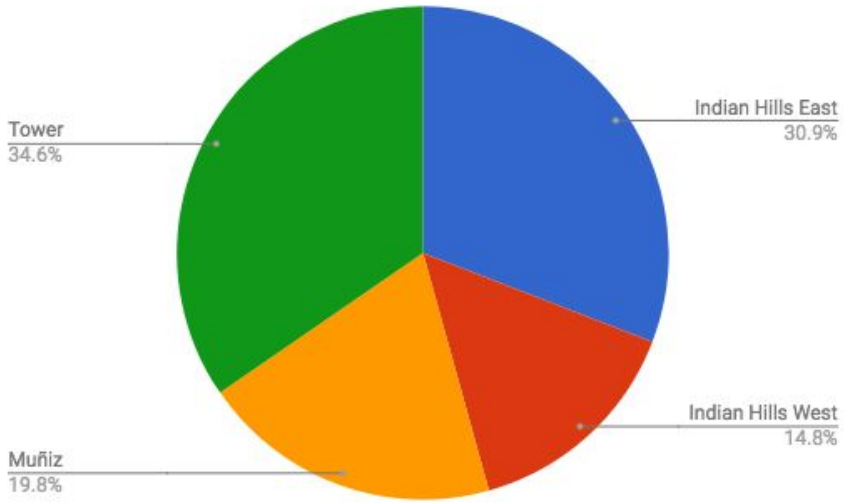


Figure 2: Gender of Respondents (n = 80)

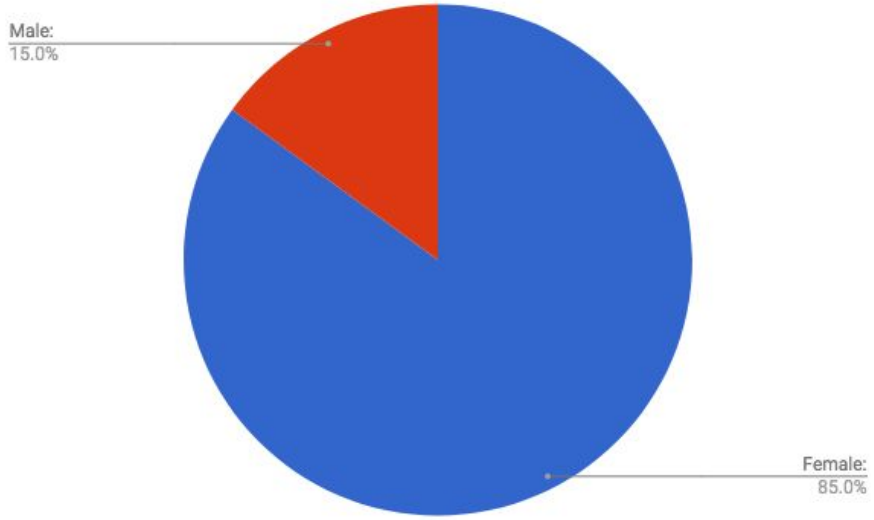


Figure 3: Household Size (n = 80, average = 4.7, median = 4)

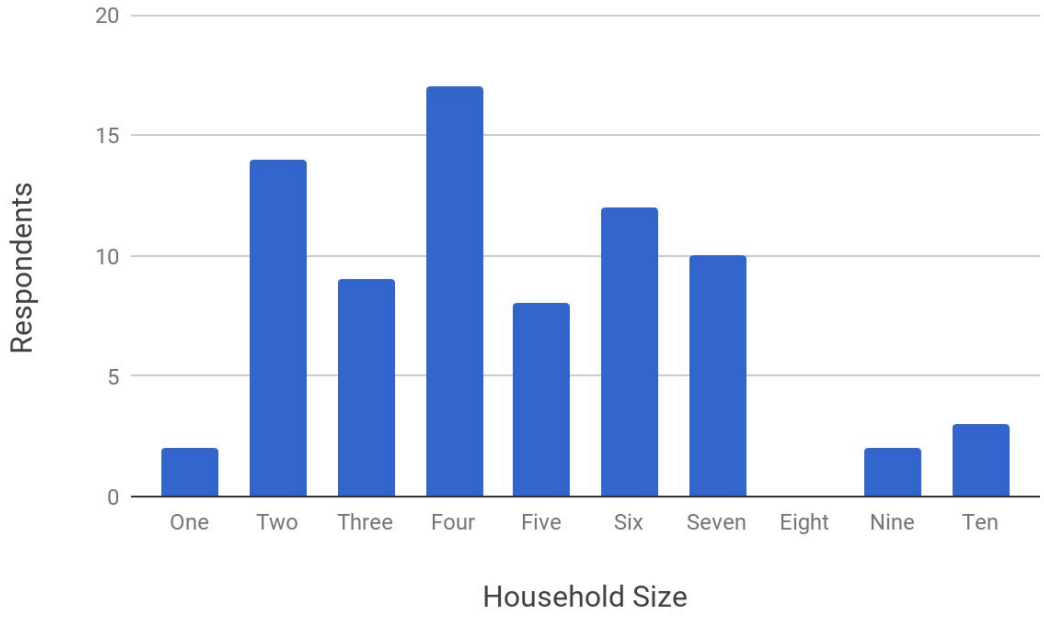


Figure 4: Minors per Household (n=80, average = 2.1, median = 2)

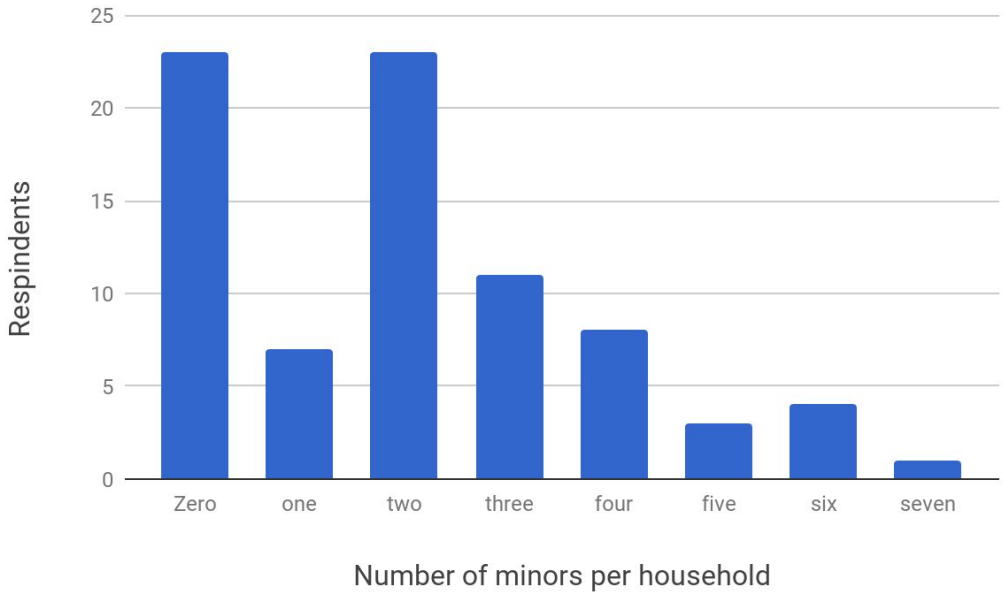
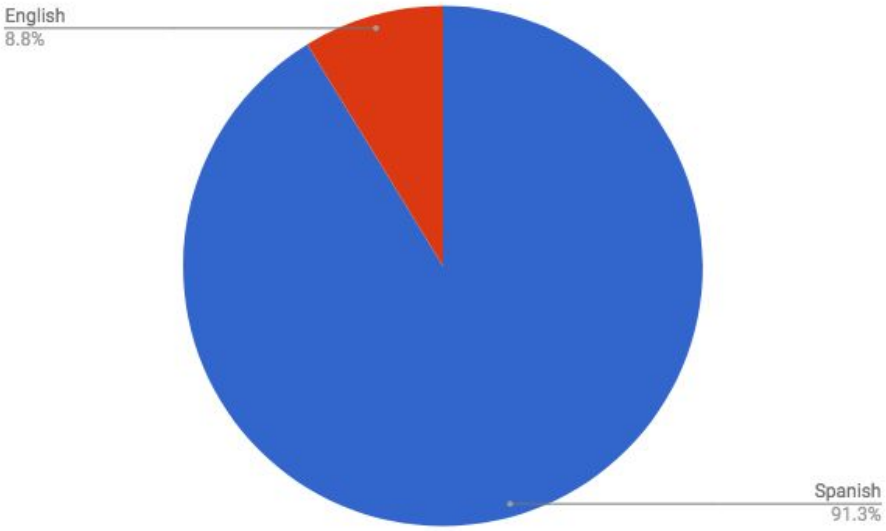


Figure 5: Preferred Language (n = 80)



Current Habits:

On recall of previous night's dinner, a majority of respondents reported eating a home-cooked meal (52.5%); other responses included fast food, snacking, pre-prepared meals, and 10% who who reported not eating dinner (Figure 6). Though over half of those surveyed reported that their source of fresh produce in the last week was from a grocery store (56.3%), responses also included local convenience stores, dollar stores, flea markets, meat markets, and with only one respondent reporting a food pantry (Figure 7). When asked about the number of servings of fruits/vegetables per day the most frequent answer was once (46.3%) with 8.8% reporting none, 26.3% reporting two, and 18.9% reporting three or more servings per day (Figure 8). When fruits/vegetables are consumed, a majority recounted eating fresh produce with a minority reporting canned or frozen fruit/vegetable consumption (Figure 9).

Figure 6: Previous Night's Dinner

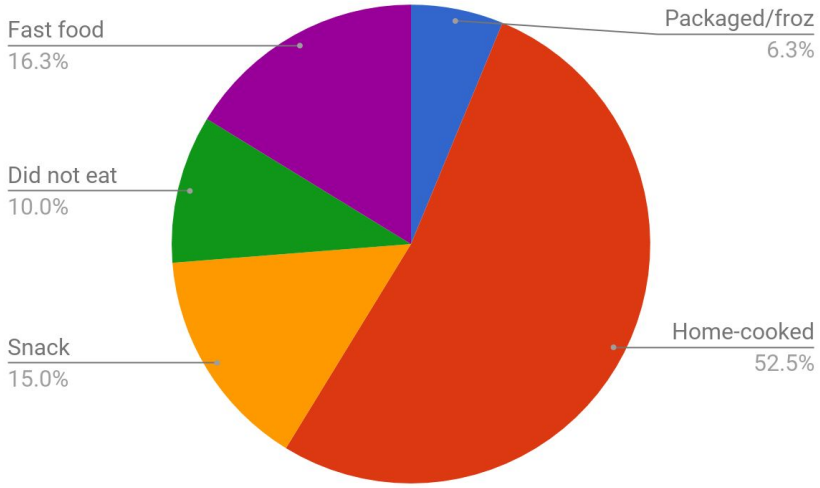


Figure 7: Sources of Fresh Produce in the Last Week

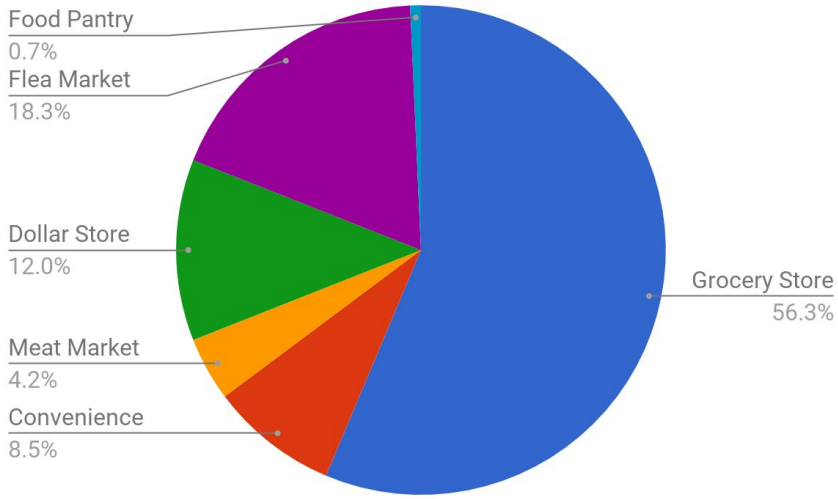


Figure 8: Servings of Fruits/Vegetables Per Day

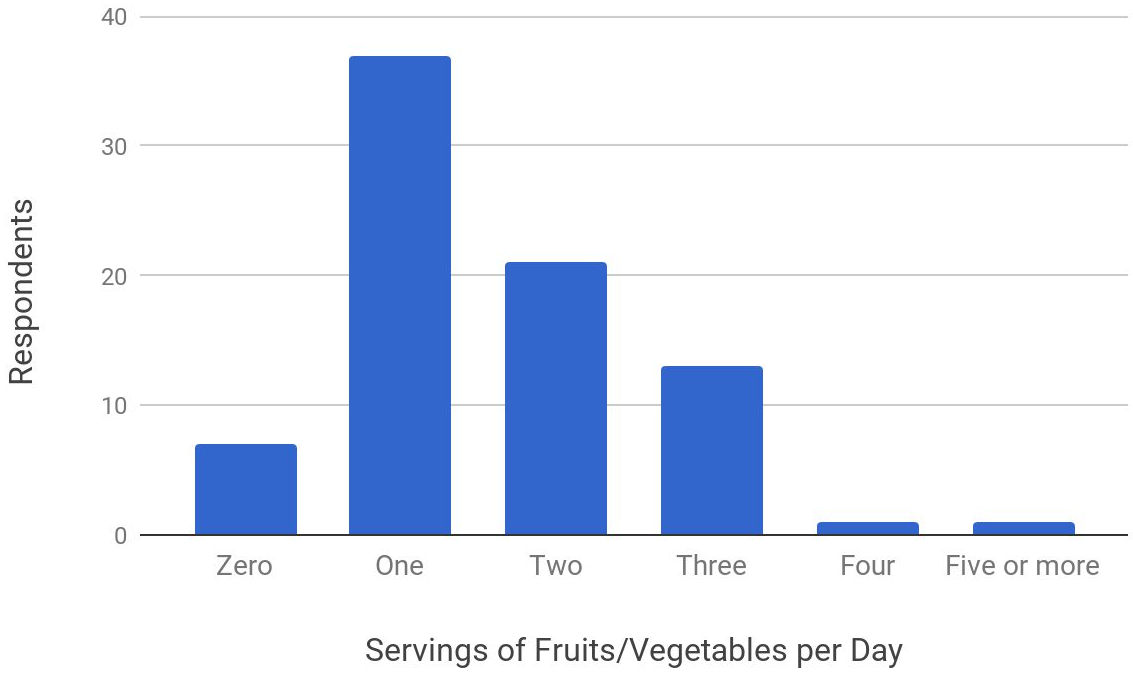
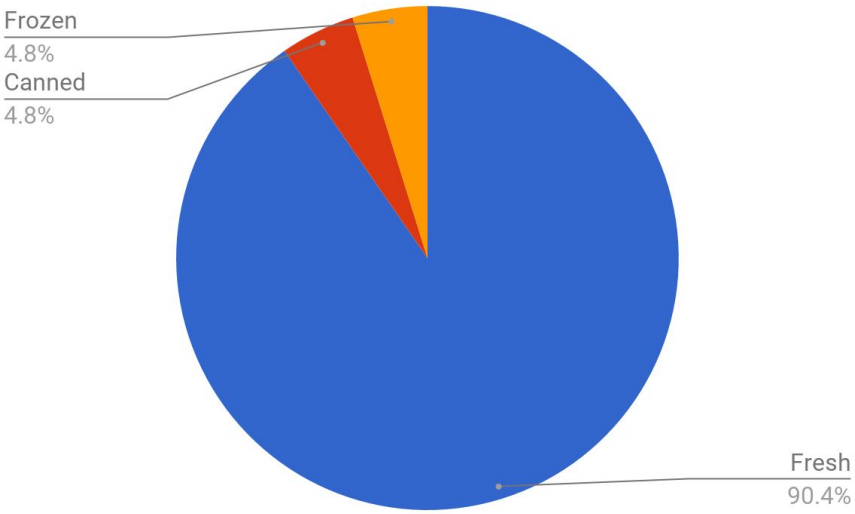


Figure 9: Types of Fruits/Vegetables Consumed



Transportation:

A majority of the respondents reported that it takes between 10-19 minutes to get to the nearest grocery store and that they frequent a grocery store once a week, on average. The most frequent mode of transportation is a personal family car (75.3%) or carpool (23.5%) with one respondent reporting to use a bicycle (1.2%). No respondents reported using public transportation (0%) or walking (0%) to obtain food or groceries.

Barriers to Consumption of Fruits and Vegetables:
When asked about why the respondents don't eat more fruits or vegetables, they reported cost, taste, and preparation time as prohibitive. Other answers included lack of knowledge about how to cook produce and that the produce runs out before next grocery store trip. Nine percent reported that they had no concern with their fruit/vegetable consumption (Figure 10). Regarding government aid, 63.8% reported any SNAP/WIC or other governmental assistance.

While 76.3% reported they had no apprehension about travel outside of their neighborhood, 23.8% reported fear due to a variety of issues. Immigration enforcement was the primary reported source of fear (Figure 11).

Two nationally recognized household food security questions (Hunger Vital Signs)were implemented to assess concerns about access to food. Based on the responses to these questions, 82.5% of respondents screened positive for food insecurity (Figures 12, 13, 14).

Figure 10: Barriers to Fruit/Vegetable consumption

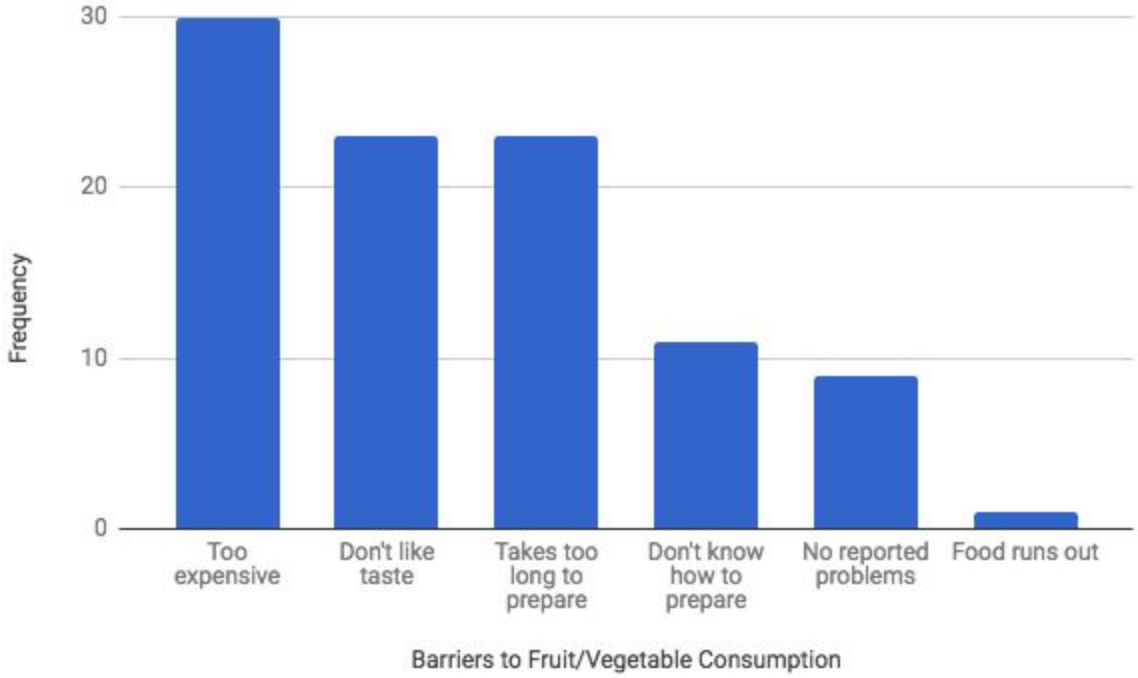


Figure 11: Fear of Leaving Neighborhood

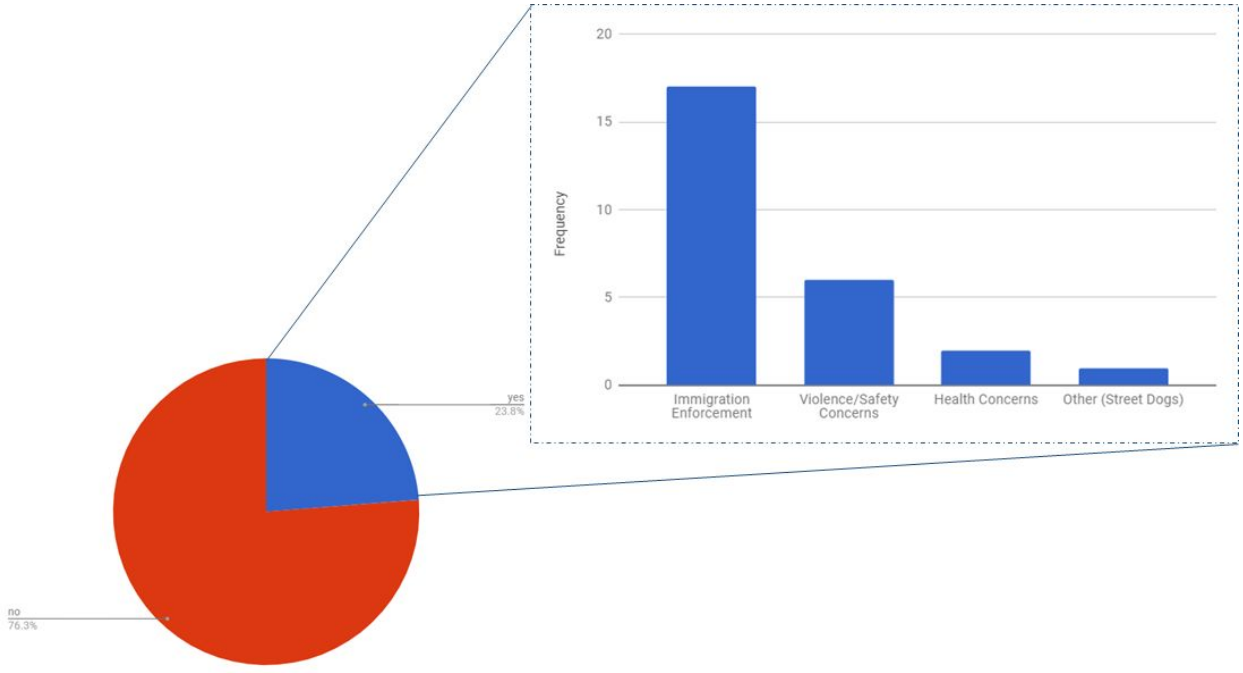


Figure 12: Hunger Vital Signs Question #1
(I worried whether our food would run out before I got money to buy more in the last year)

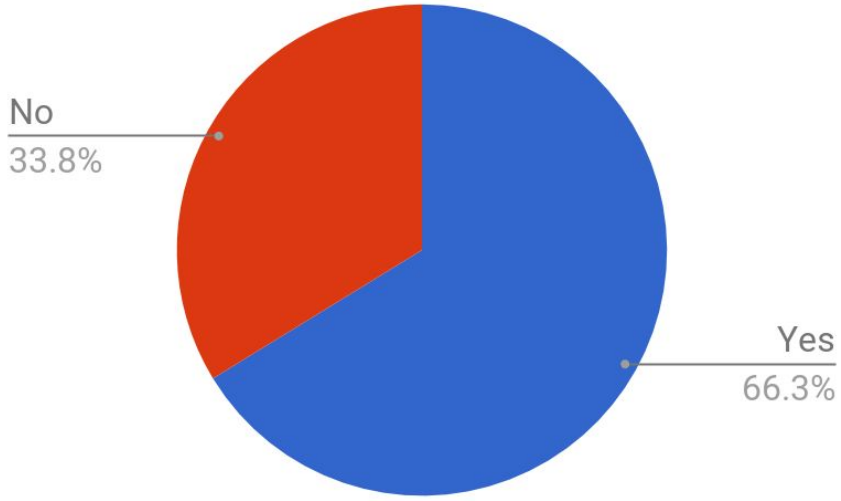


Figure 13: Hunger Vital Signs Question #2
(the food that I bought just didn't last and I didn't have money to get more in the last year)

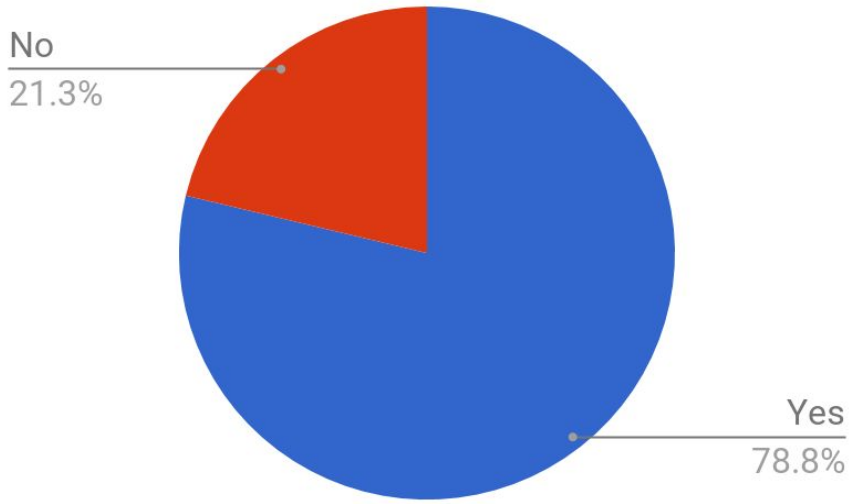
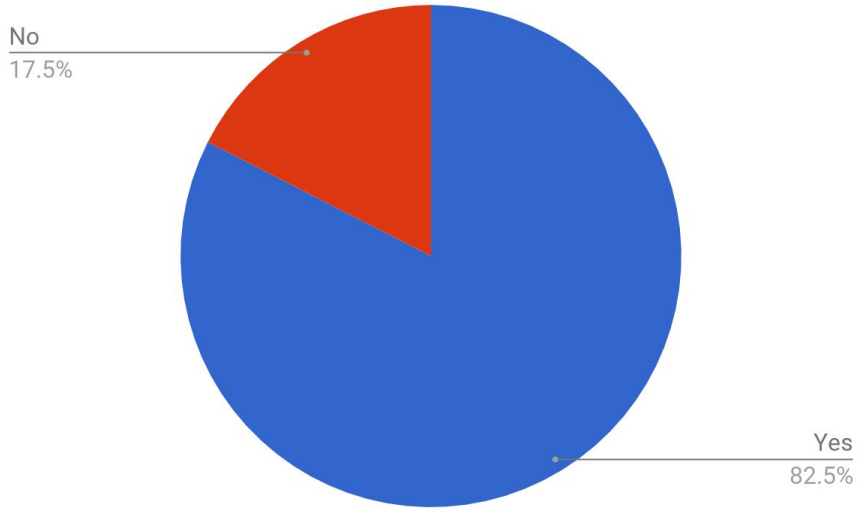
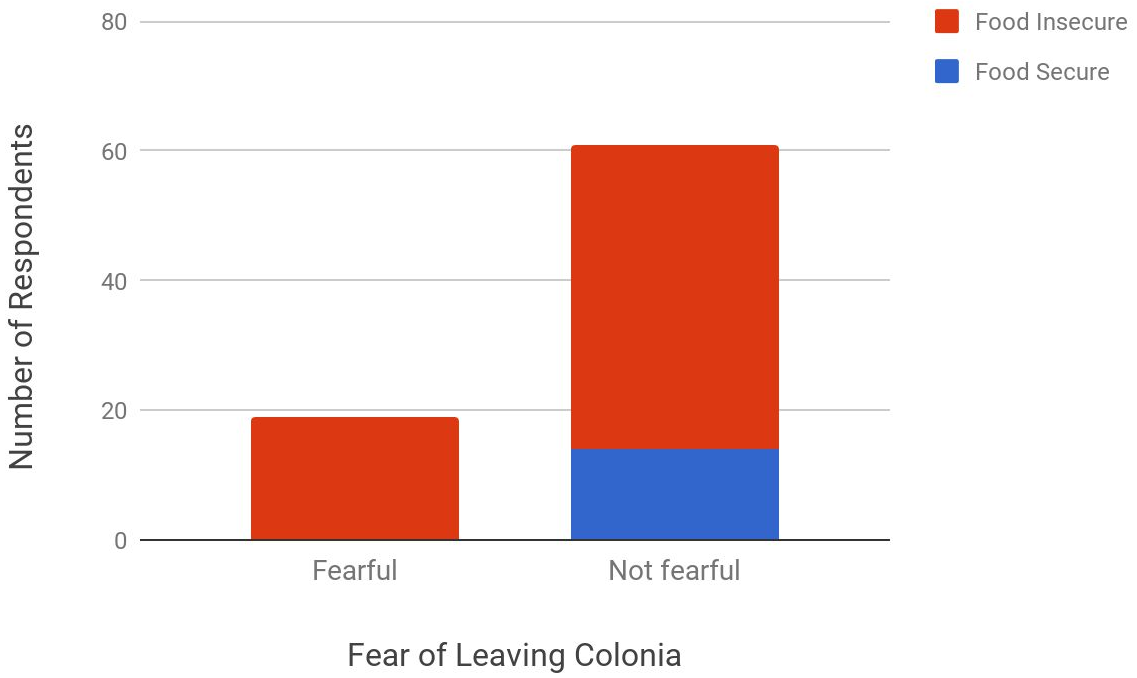


Figure 14: Food Insecurity Based on Composite Data From Hunger Vital Signs



Statistical Analysis of Barriers to Consumption of Fruits and Vegetables:
Multivariate data analysis showed a statistically significant correlation indicating that those who expressed fear of travel outside of their neighborhood were more likely to have food insecurity ($p<0.05$) (Figure 15). In fact, none of the individuals who screened negative for food insecurity reported fear of leaving their community (in other words, those who felt they had enough food never reported fear). When isolating for fear of immigration enforcement from other sources of fear, the statistically significant correlation held true between fear and food insecurity in the household ($p<0.05$) (figure not shown).

Food 15: Association of Apprehension About Travel Outside Neighborhood and Food Insecurity (P<0.05)



Interest in Consumption of Fresh Produce
Of those surveyed, 98.8% reported that healthy eating is important to them (Figure 16). The one respondent who answered “no” clarified by stating that she was more concerned about having the opportunity to feel full than healthy eating habits. A vast majority also expressed a willingness to increase fresh produce consumption if their perceived barriers to access and affordability were decreased. If fruits and vegetables were available closer to the colonias or were cheaper, 92.5% and 95%, respectively, believed they would eat more fruits and vegetables (Figures 17, 18). Ninety-six percent reported that they would be willing to eat more fruits and vegetables if they knew how to prepare them and 76.9% would be interested in cooking classes (Figures 19, 20).

Figure 16: Is Healthy Eating Important to You?

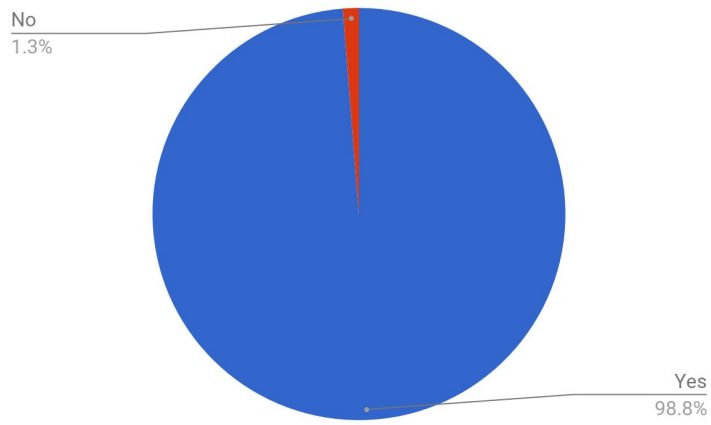


Figure 17: Interest in More Fruit/Vegetable Consumption if Available Closer to Colonias

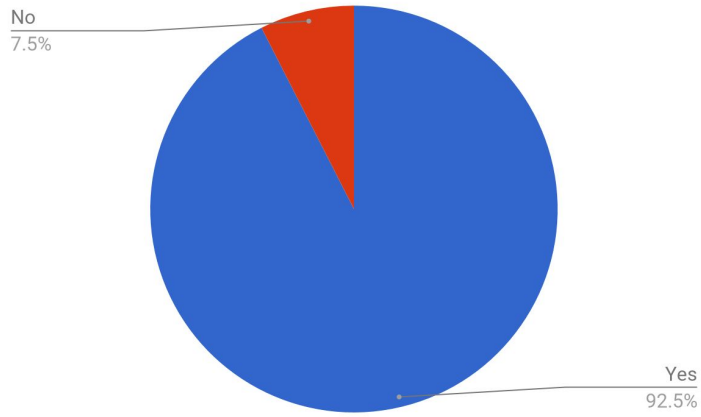


Figure 18: Interest in More Fruit/Vegetable Consumption if More Affordable

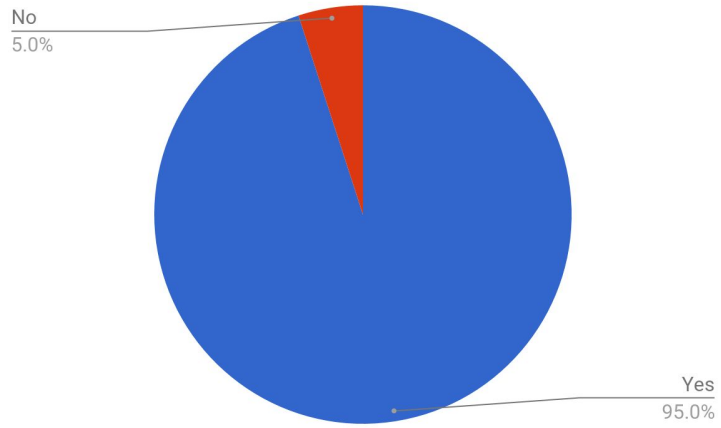


Figure 19: Interest in More F/V Consumption With Increased Food Preparation Knowledge

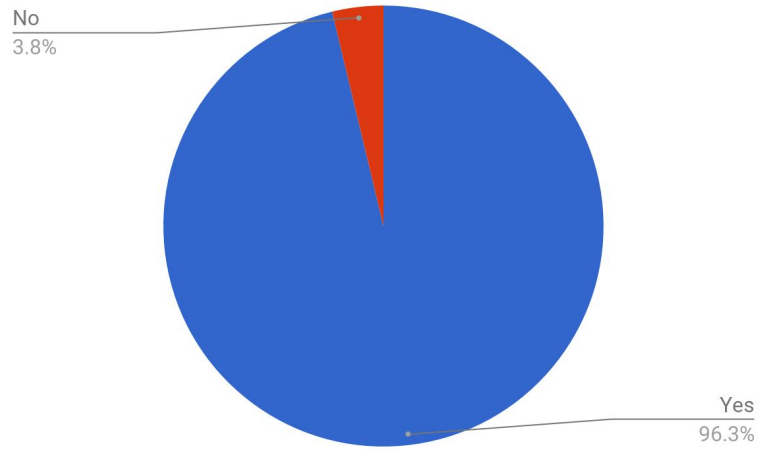
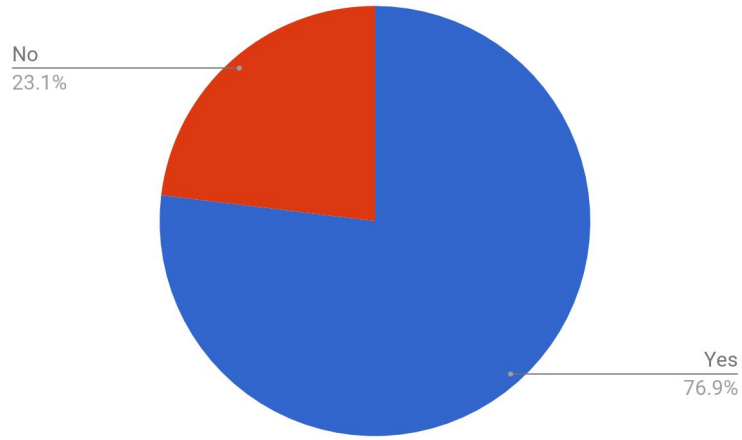


Figure 20: Interest in Cooking Classes



Discussion:

This needs assessment of Hidalgo County Texas re-demonstrates the colonias' statuses as "food deserts," with deficient access to healthy, nutritious produce options. The findings also reflect nationwide concerns for food insecurity and malnutrition and its deleterious effects (including both underweight and obesity).

One in six children in the United States live in food insecure households (AAP 2017). Texas ranks 11th in the country with approximately 16% of children struggling with food security (USDA 2017). Immigrant families and those living in rural areas have multiple stressors contributing to decreased food availability (AAP 2017), as is re-demonstrated by this sample population from the Hidalgo county colonias, where 82.5% screened positive for food insecurity. Previous research indicates that access to the nearest grocery store is a major obstacle to nutritious habits; this is exacerbated in the colonias by non-existent public transportation, poor access to cars, and isolation from healthy food sources such as grocery stores (Sharkey *et al* 2010). Cost of produce is also prohibitive, but observational studies indicate that both coupons and education programs will increase consumption of fresh produce (McCormack 2010).

This study highlights a new but serious concern that is also impeding access to nutritious options in the colonias: fear. Twenty-four percent of the survey respondents endorsed fear of leaving their colonias, and we suspect this number is an under-representation, as it is likely that not all respondents trusted surveyors. General fear, as well as fear of immigration specifically, were both positively associated with food insecurity. With perceived and real threats of immigration enforcement, members of the colonias, many of whom shared with us (anonymously) that they or members of their family are undocumented, have genuine fear to leave their home. Deportation looms as a real and persistent threat for these families, and associated stressors impede many opportunities to improve health--from hesitancy to find employment to fear of seeking medical care to physical fear of traveling to grocery stores.

This study not only demonstrates many of the impediments to accessing fresh, healthful, affordable produce, but it also highlights some of the major effects of these barriers--especially the alarmingly high rate of food insecurity.

One possible avenue to address the fruit/vegetable gap would be a mobile food van servicing the colonias with quality, affordable produce. Such programs can be tied to SNAP/WIC enrollment, can involve community organizations (including nutrition education initiatives), and can incorporate local vendors. There is clearly a vested community interest in such programs, as 92.5% stated they would consume more fresh produce if it were readily available for purchase. While the underlying problems of food insecurity are complex and multifactorial, community-based initiatives such as mobile food service vans could be mutually beneficial for all parties involved and can begin to mitigate the nutritional challenges faced by colonias.

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