A Comparison of Food Insecurity Levels and Weight Status among Rural and Urban Residing Latino/Hispanics in North Carolina

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ABSTRACT

Rural residing Latino immigrants are susceptible to poor health. The goal of this study was to measure food insecurity levels and weight status among Latinos in a rural region (N=126) in comparison to urban Latinos (N=166). To do this the following objectives were to: (1) assess the level and contributors to food insecurity and weight status in a rural Latino community, (2) compare food insecurity determinants and weight status among rural and urban Latino populations, and (3) identify barriers to food acquisition and strategies used by food insecure Latino/Hispanic families to manage limited food resources. Household surveys were conducted by two bilingual interviewers. Data on socioeconomic status, food security and assistance, measured heights and weights, and self reported weight change since arriving to the US were collected. Findings indicated that both urban and rural respondents were mostly Mexican born and consuming poor diets. Chi-square analyses showed that rural Latinos are more likely to receive food stamps (p=.032), are more likely to be overweight (48.3% vs. 33.1%, p=.035), and have higher levels of food insecurity without hunger (65.4% vs. 48.2%, p=.021). Food stamp use and food security was higher among extremely obese rural Latinos. Determinants of food insecurity and weight status differed between groups. For rural respondents, difficulty eating healthy was both a determinant of food insecurity; however this was not the case for the urban sample. Food insecurity, older age and weight gain since arriving to the US were determinants of overweight/obesity among urban respondents. Rural residence poses a barrier for Latino immigrants and must be addressed when developing nutrition interventions.
INTRODUCTION

“The prevalence of food insecurity among low income, legal immigrants is unacceptably high.”¹ In 2002, 21.9% of Latino/Hispanic households in the United States were food insecure compared to the national average of 11.1%.² Latino/Hispanics arriving to the United States are particularly at risk for food insecurity and poor health status. For immigrants living in a country where Spanish is not the primary language, access to basic health and nutrition services is compromised, thus, leaving this group at greater risk for illness and disease. Latino/Hispanic immigrants frequently accept low-paying jobs with no health insurance which further impedes their access to health care. Many Latino/Hispanics are uninsured and because much of this population does not qualify for Medicaid benefits or other assistance programs due to financial or legal restrictions (such as immigration laws)³ they often go without access to primary care.

In addition to their limited access to basic health care, many recently arrived Latino/Hispanic immigrant households lack access to community food assistance. Coupled with low incomes and difficulties with affording sufficient food for their families, many of these households are at high risk of being food insecure. In fact, households that have children, are large, are low income, have a head that is low educated, and who do not receive food stamps are more likely to be food insecure.¹,⁴,⁶ It is also well recognized that ethnicity, specifically Latino ethnicity, is significantly associated with food insecurity.¹,⁴,⁵ Latino/Hispanics are more likely to live in food insecure households. It is posited that this relationship is due to limited English proficiency of these immigrants.¹,⁴ Language may limit food shopping and subsequently food choices and increase food costs.⁴ Thus, Latino/Hispanic immigrants are at increased risk for food insecurity.

The problem of food insecurity is also likely to manifest differently as a consequence of the availability of support systems and density of population groups. It is likely that Latino/Hispanic immigrants living in rural areas face additional barriers that their counterparts do not experience living in urban areas. Urban areas are more likely to have more services available to low income of any ethnicity and consequently offer more resources to food insecure families than those living in less populated and less service dense areas.

To whom it is a problem: Food insecurity has substantially increased in the last 5 years for low-income households not receiving food stamps. Households below the poverty line, Hispanic households and households with children are at greatest risk for hunger.²,⁷ Food insecurity rates of rural households are double the nationwide rates.⁸

Negative effects of food insecurity: High rates of food insecurity are of concern because food insecurity has been associated with many negative diet and health consequences. Low-income groups face many barriers that contribute to poor dietary quality and health outcomes. Socioeconomic status, living in limited-resource households and high food costs negatively affect dietary quality.⁴,⁷,⁹ Household food insecurity is associated with poor dietary intakes among children, women and elderly, as well as adult and child obesity.¹⁰-¹² Obesity is more prevalent among food insecure households and increases as food insecurity becomes more severe.⁵

Vulnerability of Latino/Hispanic population to obesity: The Latino/Hispanic population is particularly vulnerable as they have disproportionately high rates of obesity and diet related
chronic diseases compared to Caucasians and African Americans. The incidence of obesity in the United States among Latino/Hispanics is 64.5% compared to non-Hispanic whites (56.2%). The Latino/Hispanic population has extremely high rates of obesity, diabetes, and increased chances of dying from certain cancers and heart disease than non-Hispanic whites. Being overweight or obese is associated with most chronic diseases such as diabetes, cardiovascular disease, hypertension, coronary heart disease and cancer. Living in a rural area only compounds these issues as there is limited availability and accessibility of necessary resources.

**Incidence of Poverty among Rural Latinos:** Approximately 20% of the population resides in rural areas. Food insecurity rates of rural households are double the nationwide rates. Households located in the South and in rural regions have a higher incidence of food insecurity than metropolitan households (12.4% and 11.6% vs. 8.8%). Currently, Latino/Hispanics are the fastest growing rural minority. Rural areas are less likely to have culturally appropriate assistance programs which is of concern because rural Hispanics had a very high rate at 25.4 percent, or more than one out of every four rural Hispanics living in poverty in 2001. These rates were much higher than the 11.1 percent rural poverty rate for non-Hispanic Whites. The incidence of rural poverty for Hispanics was significantly more than 2 times greater than the rate for non-Hispanic Whites. The high rate of poverty for Hispanics is noteworthy as their share of the rural population has been increasing over the last decade.

**PROBLEM STATEMENT**

Given its potential impacts on health and well being, understanding the determinants of food insecurity and weight status is essential. Currently, little has been done to assess the food security levels of the increasing, rural Latino/Hispanic population. This is of particular importance as this group, compared to non-Hispanic whites, is at the greatest risk for poverty, poor dietary intake and the development of diet related chronic diseases, such as obesity.

**GOALS**

The goals of this project were to: (1) assess the level and contributors to food insecurity and weight status in a rural Latino community, (2) compare food insecurity determinants and weight status among rural and urban Latino populations, and (3) identify barriers to food acquisition and strategies used by food insecure Latino/Hispanic families to manage limited food resources.

**Study Site** Siler City, North Carolina in Chatham County is the proposed site for this research project. According to the U.S. Census Bureau, Siler City is located in a rural region. It is located approximately 35 miles from Greensboro in Guilford County, the urban comparison site. Both locations have experienced similar significant increases in Latino/Hispanic migration in the past decade. According to the 1990 U.S. Census, only 3.1% of Siler City residents were Hispanic. In 1995, however, it was estimated that 38% of Siler City residents were Hispanic, reflecting the considerable influx of Hispanic residents. Based on 1998 estimates, over 2200 Siler City residents are Latino/Hispanic and this number continues to increase; thus, increasing the likelihood of meeting the proposed recruitment of 200 study participants. This demographic shift has prompted many social and economic changes in the community. Increases in
Latino/Hispanic migration, specifically Mexican migration, in this region is projected to continue. The Latino/Hispanic population is new and is struggling with similar challenges in adjusting to a new way of life. As is the case in the more urban area of Greensboro/Guilford County, one of the primary health issues of rural Latino/Hispanic women and children is nutrition.

CONCEPTUAL FRAMEWORK

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A version of the 18 Item Core Food Security/Hunger Module that had been translated and face validated along with a survey examining socioeconomic status and demographics; nutrition knowledge, attitudes, behaviors, beliefs; strategies for managing food; respondent and respondent reported child dietary intakes utilizing a brief, pretested food frequency questionnaire; acculturation; food security; food assistance program participation and anthropometrics (heights/weights/waist circumference) was administered. Data collection was conducted by a bilingual, bicultural interviewer in respondents’ homes.

Selection criteria for participation included the following: Participants needed to be ① residents of Siler City, NC ② low income, ③ the primary caretaker of a child ≤ 12 years of age, ④ the primary meal preparer, and ⑤ self identified as Latino/Hispanic. Ethnicity was determined by self report as well as birth place and where they grew up. Participants were recruited through community agencies as well as through “snowball” sampling. This last method of recruitment has proven extremely successful in identifying eligible participants for the previously reported study conducted in Guilford County. Although a randomly selected sample is preferred, predetermination of this population is not feasible so it will be necessary to survey a nonrandom sample of volunteer participants. An additional consideration, based on previous work with this population, is their general hesitance to participate in research studies, which reduces the likelihood that a random sample can be obtained. In order to increase the likelihood
of participation, respondents were recruited by an experienced bilingual, bicultural community interviewer. To partly offset sampling bias, the sample of 127 respondents provided a reasonably representative sample of the population of interest and enough to make comparisons.

Questions regarding barriers and strategies used by the study participant to obtain adequate food include: Does the respondent rely on low cost, high energy foods (i.e., fast food)?, Does the respondent rely on family members?, and Does the respondent participate in food assistance programs?. As a follow up to these survey questions, an ethnographic/qualitative component in which structured or semi-structured questions with probes that allow for more open ended answers was developed and used. A sub-sample of respondents was selected for these in depth interviews. The interviews will be especially useful when trying to identify barriers to food acquisition and strategies used by food insecure Latino/Hispanic families to manage limited food resources. In depth interviews were conducted by a bilingual, bicultural nutrition professional using a question guide developed based on the preliminary findings of the survey. All interviews were conducted in Spanish, tape recorded and documented with field notes. This component of the study is of particular importance as it will help to better understand the food assistance needs of this population above and beyond that of food stamps. Although the receipt of food stamps is associated with a lower incidence of food insecurity, Latino/Hispanic immigrants are often times not eligible for participation due to various legal issues. Additionally, as food insecurity has been found to be positively associated with obesity, and this population is extremely vulnerable, understanding barriers and strategies may help to explain this paradox.

DATA ANALYSES

The analyses for Objectives 1-3 was conducted using SPSS version 14.0. Responses to the 18 Item Core Food Security/Hunger Module were used to classify respondent households into one of four food security status groups: (1) food secure, (2) food insecure without hunger, (3) food insecure with moderate hunger and (4) food insecure with severe hunger. Anthropometrics (height/weight/waist circumference) were taken to assess weight status.

Demographic and other descriptive data were used to develop profiles of respondents. These profiles provide a basis for determining relationships of demographic and other descriptive data with level of food insecurity and weight status. Relational analyses using Spearman correlation and Chi-square tests were used to assess relationships of food security and weight status, with socioeconomic and demographic and household characteristics, level of acculturation, food assistance program participation, and frequency of food group consumption. Socioeconomic and demographic variables included: age, gender, employment, education level, and ethnicity. Household characteristics included: number of household members, number of children living in the house, and monthly income. Level of acculturation was measured using a series of indicators including language spoken at home, language ability/fluency, country of birth, and country in which last schooling was received. Food assistance program participation questions included participation by any household members in the Food Stamp Program, WIC, food banks, or other community resources. Food group consumption was assessed using a brief, pretested food frequency questionnaire. Results of these univariate analyses were used to test for multivariate relationships (using logistic regression) among variables as predictors or determinants of food security and weight status classification.
Logistic regression analyses were used to compare models of determinants of food security for the rural (Siler City/Chatham County) and urban (Greensboro/Guilford County) samples. Odds ratios were used to determine the strength of association of determinants of food security and weight status between the two geographic regions.

As data analysis is ongoing, qualitative results will not be discussed in this paper. All tape recordings will be transcribed and field notes will be summarized by the bilingual, bicultural interviewer. Content analyses will be conducted to identify common themes and strategies used by participants to obtain adequate food.

RESULTS

Significant differences were evident in several socioeconomic and demographic characteristics between urban and rural groups. Compared to the urban respondents, rural respondents were more likely to be older and recipients of food stamps. There was no difference in ethnicity, education level or employment status of the household head (Table 1).

Table 1: Urban and Rural Descriptive Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Urban (N=166)</th>
<th>Rural (N=126)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (± SD)</td>
<td>28.4 ±6.2*</td>
<td>32.1±7.5</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Mexican</td>
<td>68.7</td>
<td>78.3</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% ≤ 8th grade</td>
<td>60.6</td>
<td>53.9</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Full time</td>
<td>74.1</td>
<td>60.5</td>
</tr>
<tr>
<td>Food Stamp Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Current</td>
<td>16.0*</td>
<td>26.7</td>
</tr>
</tbody>
</table>

The majority of respondents, regardless of location of residence, was born in Mexico and spoke only Spanish both in and out of the home. Compared to urban Latinos, a significantly higher percentage of rural Latinos did come from a country other than Mexico (8.4% vs. 24.0%, p<.05). An average of 5 individuals lived in a household. Rural respondents have lived in the US significantly longer than urban respondents (9.0±6.9 years vs. 4.5±3.2 years, respectively; p<.05).

Food Insecurity

Level of food security did differ between groups (Figure 1). Rural Latinos were significantly more likely to report higher levels of food insecurity than urban Latinos.
Health Status

No differences were evident in self rated health for respondents and child between rural and urban groups. However, in terms of diagnosed diabetes, rural respondents were significantly more likely to have been diagnosed with diabetes than urban respondents (11.9% vs. 4.2%, respectively, p=.046).

Weight Status

Weight status was categorized using measured heights and weights to compute BMI. Average BMI did not significantly differ between urban and rural respondents. However, BMI categories (normal, overweight, obese) did indicate significant differences. Rural respondents were more likely to be overweight (BMI $\geq 25.0 \text{ kg/m}^2 < 29.9 \text{ kg/m}^2$) and less likely to be at a normal weight at the time of the interview (Figure 2). Urban Latinos were more likely to be obese.

Based on self-report, there was no significant difference in weight gain since arriving in the US. Both rural and urban Latinos reported similar weight gains (23.3lbs. vs. 17.8lbs.; p=.117). Although rural respondents have lived in the US longer there was no significant difference in BMI for respondents that have lived in the US for $\leq$ 5 years and those that have been in the US > 5 years. When broken down further into $\leq$ 2 years, 2-10 years and > 10 years, however, length of time in the US for urban Latinos was associated with BMI. Those residing in the US for > 10 years had a trend toward a higher BMI (28.8 kg/m$^2$ vs. 28.9 kg/m$^2$ vs. 32.7 kg/m$^2$, p=.079).
Dietary Intake and Behaviors

Food frequency data indicate that both rural and urban Latinos (adults and children) are consuming well below the recommended servings of fruits and vegetables.

Table 2: Daily Fruit and Vegetable Servings (Respondents only)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Urban</th>
<th>Rural</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruits (excluding juices)</td>
<td>1.0</td>
<td>1.4</td>
<td>.002</td>
</tr>
<tr>
<td>100% fruit juice</td>
<td>.98</td>
<td>.87</td>
<td>.325</td>
</tr>
<tr>
<td>Green Leafy vegetables</td>
<td>.10</td>
<td>.40</td>
<td>.000</td>
</tr>
<tr>
<td>Other vegetables</td>
<td>.50</td>
<td>.70</td>
<td>.004</td>
</tr>
<tr>
<td>(lettuce, tomatoes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starchy vegetables</td>
<td>.30</td>
<td>.40</td>
<td>.014</td>
</tr>
<tr>
<td>Legumes (chick peas, pigeon peas)</td>
<td>.67</td>
<td>.87</td>
<td>.014</td>
</tr>
</tbody>
</table>

Rural Latinos are consuming significantly more fruits and vegetables than urban Latinos. Total daily fruit consumption (fruits + 100% fruit juice) for both groups does reach minimum recommendations. However, total vegetable consumption, (green leafy + other vegetables + starchy vegetables + legumes) falls below the recommended servings.

Interestingly, rural respondents were more likely than urban respondents to report feeling that it was difficult to eat healthy (59.2% vs. 39.8%, p=.001), yet they are eating a healthier diet. Rural Latinos also reported having a lower self-efficacy with regard to selecting healthy snacks for their children.

Bivariate analyses

In examining the association of food security status and food stamp participation with BMI, results indicate that among rural respondents there is no association. Length of time in the US, however, was significantly associated with food security and food stamp use. For urban Latinos, the longer they have been in the US, the more likely they are to have been receiving food stamps (p=.014). For rural Latinos, no association with food stamp use was noted, however food insecurity was significantly higher the longer the residence in the US (p=.073).

Determinants of Food Security and Weight Status

Logistic regression revealed that determinants of food insecurity and weight status differed between groups. (Tables 3) For rural respondents, difficulty eating healthy was a determinant of food insecurity; however this was not the case for the urban sample.

Table 3: Determinants of Food Insecurity– Rural (N=102)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratio (95% CI)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficult eating healthy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes a</td>
<td>3.72 (1.33-10.41)</td>
<td>.021*</td>
</tr>
<tr>
<td>No a</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

a Reference value
* significant @ p<0.05
Food insecurity, older age and weight gain since arriving to the US were determinants of overweight/obesity among urban respondents. (Table 4)

Table 4: Determinants of High Weight Status– Urban (N=162)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratio (95% CI)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reage</td>
<td>1.095 (1.003-1.195)</td>
<td>.042*</td>
</tr>
<tr>
<td>Weight change</td>
<td>1.053 (1.025-1.080)</td>
<td>.000*</td>
</tr>
<tr>
<td>Food insecurity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secure</td>
<td>.341 (.129-.897)</td>
<td>.021*</td>
</tr>
<tr>
<td>Insecure a</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

a Reference value
* significant @ p<0.05

DISCUSSION

The objectives of this project were to: (1) assess the level and contributors to food insecurity and weight status in a rural Latino community, (2) compare food insecurity determinants and weight status among rural and urban Latino populations, and (3) identify barriers to food acquisition and strategies used by food insecure Latino/Hispanic families to manage limited food resources. For the purposes of this paper, only objectives 1 through 3 were addressed. Data analysis for objective 4 is still ongoing.

Regardless of rural or urban designation, all study respondents were primarily low income, Mexican women with low education levels living in households with an average of 5 individuals. There are clear distinctions, however, with regard to age and participation in the food stamp program. As seen in research utilizing data from the Current Population Survey (CPS), findings from this project support the fact that food stamp participation is higher in rural areas compared to urban areas. Subsequently, food insecurity is higher in rural Latinos than urban Latinos. In contrast, Oberholser and Tuttle found high levels of food insecurity in Maryland households, however, no significant differences in households residing in rural or urban counties.

As supported by Jackson et al, BMI was significantly greater in rural verses urban residing respondents. Rural respondents were less likely to be at a normal weight and more likely to be overweight. Although rural respondents have resided in the US significantly longer than their urban counterparts and reported a greater weight gain since moving to the US, time in the US was not significantly associated with BMI among rural Latinos. Similar results were noted by Bowie et al in which length of time in the US was not associated with BMI among California Latino men and women. For urban Latinos, however, length of time in the US approached significance with regard to BMI. Residence of greater than 10 years was associated with a higher BMI. These findings do support to some extent research conducted by Himmelgreen et al which indicates that for Puerto Ricans, length of time in the US is positively associated with weight gain. It is not possible to tell from these data whether weight gain has been continuous or occurred all at once and never lost; as a corollary diabetes is also higher among rural respondents. There is limited research regarding this difference, however, Arcury et al did find that rural residing Latinos do have strong beliefs regarding diabetes. Despite these beliefs though, rates particularly among Latinos in general are increasing. The fact that rural respondents have been in the US longer may be attributed to the steady work available
to them in the poultry factory in the rural setting; whereas employment for urban respondents may be more sporadic and seasonal. The fact that rural Latinos have resided in the US significantly longer than their urban counterparts may help to explain the higher rates of diagnosed diabetes. This may be due to the fact that they have adopted unhealthy behaviors so often associated with the US culture or to the fact that they are more accustomed to the health care system and are more likely to have seen a doctor.

Lastly, although food security status and food stamp participation were not associated with BMI in rural residents, food security was among urban residents. Those that were either overweight or obese were more likely to report food insecurity. This supports several studies that have indicated a positive relationship between food insecurity and overweight.11,27,28 It is important to note that food stamp analyses are limited in that participation levels were very low due to residency restrictions.

Very few studies have examined determinants of food insecurity and weight status among Latino immigrants. As with this study many other researchers have identified food insecurity as a determinant of overweight.12,28,29 This study is unique, however, in that it addresses difficulty eating healthy as well as self-reported weight gain since arriving to the US. These are key variables that need further exploration in future studies.

**IMPLICATIONS**

Findings from this research are particularly relevant because they will help to identify patterns among sample characteristics which may result in high rates of food insecurity and overweight/obesity. The comparison of food security and overweight/obesity levels between rural and urban Latino/Hispanics, will aid policy makers in better understanding the unique situation rural settings pose to immigrants. As it is, rural residents, in general, have lower levels of education, and are poorer than urban residents yet they have less access to assistance programs. Latino/Hispanics are even more likely than non Hispanic Whites and African Americans to have incomes less than the poverty level and develop chronic diseases. Additionally, many Latino/Hispanics are without food assistance because much of this population does not qualify due to financial or legal restrictions (such as immigration laws). The Latino/Hispanic population is clearly growing among rural areas. This research will aid in identifying strategies to avoid or deal with the impact of food insecurity and the incidence of overweight/obesity among this population.

Findings will also provide valuable insight into the strategies used by Latino/Hispanics to manage their limited food resources and help to identify whether or not these strategies are in part contributing to incidence of overweight/obesity. As Latino/Hispanic migration continues to increase in Southern rural regions, these findings will also have relevance outside of North Carolina.
References


