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Food Insecurity is Associated with Acculturation and Social Networks in Puerto Rican Households

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INTRODUCTION

The concepts of food security and hunger were redefined in the US when it was realized that these were public health issues not just in developing countries but also in industrialized nations (1–6). The food security construct is defined as, “access by all people at all times to enough food for an active, healthy life and at a minimum includes the ready availability of nutritionally adequate and safe foods and the assured ability to acquire personally acceptable foods in a socially acceptable way” (2). In 2007, 11.1% or about 13 million American households were affected by food insecurity (7). Households at the highest risk of food insecurity are those with children, with incomes below the poverty line, of black or Latino ethnicities, located in central cities or non-metropolitan areas, and headed by single mothers.

About 20.1% of Latino households are food insecure and this problem is even more prevalent among Latino families with children (7). Latinos also face a range of health problems such as diabetes, obesity and cardiovascular disease. Food insecurity is likely to compound these problems as it has been associated with decreased nutrient consumption and obesity (8,9). In addition, it has also been associated with mental health problems and decreased academic performance among children (9,10). High levels of unemployment, poverty and low levels of education characterize Latino communities strongly affected by food insecurity (11–13). Likewise, food stamps lasting for less than a month has been

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consistently identified as a risk factor for food insecurity among Latino food stamp recipients (12,13).

Acculturation, “a process in which members of one cultural group adopt the beliefs and behaviors of another group” (14), has been shown to have a major impact on the health status of Latinos. Specifically, higher levels of acculturation have been associated with an increased risk of obesity, diabetes and cardiovascular disease (15,16). The association between acculturation and food insecurity remains elusive. On the one hand, a nationally representative analysis study of Hispanic households (predominantly Mexican American) found adult food insufficiency associated with higher acculturation (proxied by language use) (17). On the other hand, a second study conducted with Mexican American families in California found lack of English proficiency to be a risk factor for household food insecurity (18).

As suggested by the ‘Latino health paradox’, in general, the overall health of Latinos is similar or even better than those of whites in spite of the fact that they are worse off socioeconomically (19). It has been postulated that a higher level of social capital among Latinos (shaped by social networks, trust, and reciprocity (20)) may explain in part this paradox. This hypothesis is supported by a study conducted in an inner-city multi-ethnic sample documenting a positive relationship between social capital and food security (21).

To our knowledge, no study has simultaneously examined the association of household food insecurity with acculturation and social capital indicators among Hispanics. Therefore the objectives of this study are to: 1) examine associations between acculturation indicators and food insecurity and 2) examine the influence of social networks and reciprocity on food insecurity among Puerto Ricans in Hartford, Connecticut. This is an ideal setting to answer these questions as Hartford is the second poorest city in the nation, with over half of its residents, 40% of whom are Hispanic (predominately Puerto Rican), living in poverty (22).

METHODS

The Acculturation and Nutrition Needs Assessment (ANNA) study was a cross-sectional study conducted from 1998–1999 designed to examine the influence of acculturation and social capital indicators on various food, nutrition, and health outcomes among low-income Puerto Rican families in Hartford, Connecticut. A convenience sample of 200 women were enrolled in the study. Participants were eligible if they were: (a) self-identified as Puerto Rican, (b) residents of Hartford, (c) 15 years or older, (d) not pregnant at the time of the survey, and (e) the primary caretakers of a child between the ages of 1–6 years without any medical condition requiring a special diet. If a participant had more than one child 1–5 years of age, the youngest child in that age range was chosen as the study index child. Participants also had to be eligible for or receiving food stamps since this study was funded by the Food Stamp Nutrition Education Program (FSNE) (now renamed as Supplemental Nutrition Assistance Program or SNAP). Recruitment took place at a Hartford-based service organization (the Hispanic Health Council), one local WIC office, an area children’s hospital, through street outreach, and word of mouth.

Following recruitment and written consent, surveys were conducted either in the participant’s home (90%) or in the Hispanic Health Council (10%). Trained bicultural and bilingual interviewers administered the surveys in English (9%), Spanish (77%), or both languages (14%). Following the survey, participants received a health and nutrition education packet and \$7.00 as compensation. The study was approved with full review by the human subject committees of the University of Connecticut and the Hispanic Health Council.

The survey assessed demographic and socioeconomic participant characteristics, acculturation, social networks, reciprocity, and household food security.

Food Security/Insecurity

Food security/insecurity and hunger were measured through the validated ten-item Radimer/Cornell scale (1,23). This scale has been used effectively in previous studies conducted in Hartford among Puerto Rican caretakers (11), and was found to be strongly reliable in this study (Cronbach's $\alpha = 0.91$). Each household was classified into four mutually exclusive groups: food secure, household food insecure, adult food insecure and child hunger (4). The latter three categories were collapsed in the analyses included in this paper to create a two category variable of household food insecurity (food secure vs. food insecure).

Demographic And Socio-Economic Characteristics

The demographic variables included in these analyses were marital status (single mother vs. partner in household), whether the respondent was the head of the household or not, household size, respondents age, and child's age. The socio-economic variables used in these analyses were the employment status of the respondent (employed, unemployed), household car ownership (yes, no), respondent's education level (< high school, high school, > high school), and whether the respondent had ever been homeless as an adult (yes, no). Homelessness was defined to the participants as living on the streets, shelter, halfway house or with another family because they didn't have money to pay rent.

Acculturation

For this study, acculturation was represented by birth place (Puerto Rico, Continental USA), years lived in the Continental USA, whether respondent would like to return to Puerto Rico for good or not (yes/maybe vs. no), and language(s) spoken (Spanish, English and Spanish) in response to question "Are you... 1) monolingual, English only, 2) monolingual, Spanish only, 3) bilingual (English and Spanish) 4) other (please specify)". These are commonly reported proxy indicators for acculturation among Latino populations that correlate significantly with more complex acculturation scales (24).

Social Networks And Reciprocity

The frequencies of attendance to Latino social events and Latino church (often, sometimes, almost never/never) were both used as proxy measures of social networks. Reciprocity was measured by asking participants whether they exchanged money, goods (e.g. food) and/or services (e.g. baby sitting, cooking) with friends and/or relatives.

Government And Community Assistance

Participants were asked to report if they were receiving Temporary Assistance to Needy Families (TANF) or food stamps. Food stamps recipients were also asked to report how long their food stamps lasted each month. Participants were also asked to report their participation in emergency food assistance programs, including food pantries, soup kitchens, church, and Salvation Army.

Data were entered and analyzed using the Stastical Package for the Social Sciences (SPSS) version 13.0 (SPSS Inc, Chicago, 2004). Chi-Square analyses were used to examine bivariate associations between household food security status (secure vs. insecure) and demographic, socio-economic, acculturation, social networks, reciprocity, and federal/community assistance variables. The variables included in these analyses were selected based on theoretical and empirical considerations after exploring the bivariate associations of each module variable with household food security status.

Backward stepwise multivariate logistic regression was used to examine the independent association of socio-economic, demographic, acculturation, social networks, reciprocity, and food stamps management indicators with household food security status. Variables were included in the model if they had a p value <0.10 in the bivariate analyses. Variables with p values <0.10 that were outcomes rather than predictors were excluded from the multivariate model (i.e. participation in emergency food assistance programs). One exception to this was the length of time food stamps last during a month since that this can be considered both an outcome and a predictor (i.e. food stamps that last less than 4 weeks can contribute to household food insecurity). Place of birth was also included in the model ($p=0.345$) because it was an acculturation variable. Finally, we tested for an interaction between place of birth and language preference. Because it was not statistically significant it was dropped from the final model. Results were expressed as odds ratios (OR's) and their respective 95% confidence intervals (95% CI). OR's were considered statistically significant if the 95% CI did not include the value of one. Model calibration was formally tested with the Hosmer-Lemeshow Goodness of Fit test (25) and considered appropriate at a p value of ≥ 0.05 .

RESULTS

Sample Characteristics

The majority of participants were in their late twenties, single, considered themselves heads of the household (i.e. the main income provider for the family), had children between 12–36 months of age, and were born in Puerto Rico (Table 1). The sample studied had a low-socio-economic status and relied heavily on government assistance programs. Food insecurity was prevalent with only 24% of households experiencing food security, while 40% were household insecure, 22% were adult insecure, and 14% were experiencing child hunger (results not shown).

Bivariate Analyses

Food insecurity was positively associated ($p<0.05$) with being unemployed, not owning a car, having older children, being Spanish speaking only, planning or possibly planning to return to Puerto Rico, and almost never/never attending Latino church and cultural events, receiving food stamps, not having food stamps lasting for the whole month (among food stamp recipients), and accessing any emergency food assistance. In addition, being a single mother was marginally associated with food insecurity (Table 1).

Multivariate Analyses

In multivariate analyses, food insecurity was positively associated with being unemployed, being a single mother, being born in the USA ($p=0.051$), speaking Spanish only, planning or possibly planning to return to Puerto Rico, not attending Latino cultural events, and food stamps lasting less than the whole month (Table 2).

DISCUSSION

The study's convenience sample is reflective of the low-income Puerto Rican population in Hartford county, Connecticut with similarly high levels of poverty, unemployment and low levels of education (22). These factors combined with the fact that the study specifically targeted food stamp enrolled or eligible participants, is likely to explain the higher level of household food security (76%) in this sample as compared to the US Latino population in the US (20.1%) (7). Previous studies conducted by our group also revealed a comparable high level of food insecurity in the target community (11–13).

Results from this study confirm previously reported associations between food insecurity and unemployment, as well as food insecurity and a single female headed household (7,10). These findings are of concern as Latinos are three times more likely than non-Latino whites to live below the poverty level (22.8% vs. 7.7% respectively) which places them at increased risk for food insecurity.

Attending Latino cultural events was strongly associated with food security. Those who attended Latino cultural events were also more likely to attend a Latino church (60 out of the 96 respondents attending Latino cultural events also attended Latino church vs. 49 out of the 104 not participating in Latino events). Thus, this variable is likely to be a strong indicator of social networking and access to social capital in this community. Indeed, participating in ethnic events may allow people to relate to each other and to develop a common bond that is essential for the development of social networks (20). A study carried out in Peru's mountain region showed that having a higher social capital was associated with higher food security and a higher income level (26). Another study conducted in Hartford also showed a positive association between social networks and food security (21), however it did not focus on the relationship between acculturation, social networks, food stamps management, and food security among Latinos.

The relationship between acculturation and household food insecurity in this community appears to be complex. On the one hand, a higher level of acculturation (e.g., being born in the continental USA) was marginally associated with food insecurity ($p=0.051$). On the other hand, and in full consistency with Kaiser et al. (18), a lower level of acculturation (proxied by speaking only Spanish) was also identified as a risk factor for food insecurity. It is possible that being bilingual offers important social mobility advantages to Latinos. In contrast with our study, Mazur et al. (17) found that in Latino (predominantly Mexican) households with youth, adults were less likely to cut their meal sizes because of lack of money if the parents used Spanish at home. However, the language variable used by these researchers was based on language preference and does not capture whether the parents were bilingual or not. This finding implies that future Latino food insecurity studies should probe not only for language use preference but also for proficiency in both languages.

Our findings that households where food stamps lasted for the whole month were more likely to be food secure than those where the food stamps did not last for the whole month replicates findings from another study we conducted within this target community (13). This study confirms our previous research in this community showing that even though food stamps are intended to supplement food expenditures, they do represent a major proportion of monthly household food expenditure (13). Food stamp duration was not related to household size and car ownership (data not shown) suggesting that food stamp duration is related to budget/food management skills and not to the per capita food stamp allotment. This calls for further support of home economics nutrition education programs such as Expanded Food and Nutrition Education Program (EFNEP) and Supplemental Nutrition Assistance Education Program (SNAP-Ed). These efforts need to take into account the strong Spanish language preference in this community as evidenced by the fact that even though 72% of respondents were bilingual, 77% preferred to be interviewed in Spanish.

There were some limitations to this study. The data were collected a decade ago. However, findings are still relevant today in this community where poverty and food insecurity rates continue to be at similar or higher levels. Social networking was defined based on participation in Latino church services and/or cultural events. In the case where respondents did not participate in these social/religious events, we did not ascertain if they participated in similar events hosted by non-Latino groups. Thus, the level of social networking among those not participating in Latino events may have been underestimated. The net influence of

this potential bias would go against our hypothesis (i.e. it would make more difficult to detect a relationship between social networks (as defined in our study) and household food insecurity). For this reason this bias, even if present, does not refute the main conclusions from our study. The cross-sectional nature of this survey does not allow us to assess causality and the temporal sequence of events (i.e., do weak social networks lead to food insecurity? or do food insecure individuals also happen to be those that are depressed, isolated, and unlikely to participate in social networks?). Longitudinal studies examining acculturation, social networks, reciprocity, and household food insecurity will help to confirm the findings from this study and infer causality. In this study we did not keep track of the number and characteristics of those individuals who refused to participate in the study. Thus, the extent to which self-selection bias may have occurred could not be determined. Findings from this predominantly Puerto Rican sample may not be generalizable to other Latino sub-groups.

IMPLICATIONS FOR RESEARCH AND PRACTICE

Our study suggests that, besides effective poverty reduction policies, food security among Latino households may be achieved by enhancing supportive networks (an important dimension of social capital) in their communities, and by improving food stamp management skills at the household level. Lessons learned from nutrition education studies that have applied behavioral change theories that take into account the socio-ecological context in which individuals live (27) may be quite relevant for understanding how to improve household food security through the strengthening of social networks.

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Table 1

Characteristics of Puerto Rican Participants living in food insecure and food secure households in Hartford, Connecticut.

	All n=200	Food Insecure n=152	Food Secure n=48	P
	%			
Socio-economic				
Employed	23	18	40	0.003
Car	41	37	54	0.041
High school education or greater	38	37	42	0.548
Ever homeless as adult	29	32	21	0.131
Demographic				
Child age				0.041
12–24 mo	35	38	25	
25–36 mo	30	25	44	
37–71 mo	35	36	31	
Respondent's age				0.332
15–19 y	10	10	10	
20–30 y	58	56	67	
31–62 y	31	34	23	
Single mother	60	64	50	0.088
Head of household	77	79	73	0.383
Household size				0.478
2 people	14	15	10	
3–4 people	45	43	54	
5–6 people	29	31	23	
7–11 people	11	11	12	
Federal assistance				
TANF	59	62	51	0.189
Receives food stamps	77	82	65	0.014
Food stamps last all month ¹	51	44	77	0.001
Child enrolled in WIC	80	81	77	0.576
Emergency food assistance				
Food pantry	7	9	0	0.028
Soup kitchen	2	3	0	0.200
Church	3	4	0	0.162
Salvation Army	11	13	4	0.096
Any emergency assistance	14	17	4	0.023
acculturation				
Birth place, Puerto Rico	69	68	75	0.345
Years in USA				0.527
1-<5 y	34	35	33	

	All n=200	Food Insecure n=152	Food Secure n=48	P
	%			
5-<10 y	14	13	19	
10-<15 y	15	14	19	
≥15 y	36	38	29	
Language(s) spoken				0.045
Spanish only	28	32	17	
English and Spanish	72	68	83	
Return or may return to Puerto Rico for good	47	53	28	0.003
Social networks				
Attends Latino cultural events				<0.001
Often	12	7	27	
Sometimes	35	34	42	
Almost never/never	52	59	31	
Attends Latino church				0.034
Often	16	16	17	
Sometimes	33	29	48	
Almost never/never	50	55	35	
Reciprocity (<i>Exchange (lending/borrowing) with relatives, friend, neighbors</i>)				
Money	41	40	44	0.657
Goods (eg. food)	21	22	21	0.897
Services (eg. Baby sitting)	50	53	44	0.283

¹ includes only participants receiving food stamps (n=124 among food insecure; n=24 among food secure).

Table 2

Adjusted odds for independent factors related to household food insecurity among Puerto Ricans in Hartford, Connecticut calculated by multiple logistic regression (n=192)¹.

Variable	n	OR	95% CI	P
Caretaker employed				
Unemployed	145	2.69	1.10–6.58	0.030
Employed	47	1.00	---	
Marital status				
Single/separated/divorced	117	2.34	1.01–5.42	0.047
Married/common law	75	1.00	---	
Birth place				
USA	60	2.68	1.00–7.19	0.051
Puerto Rico	132	1.00	---	
Language				
Spanish only	51	3.15	1.06–9.34	0.038
English & Spanish	141	1.00	---	
Return to Puerto Rico for good?				
Yes/Don't know	90	4.58	1.83–11.47	0.001
No	102	1.00	---	
Attends Latino events				
Almost never/never	100	6.85	2.18–21.53	0.001
Sometimes	24	2.28	0.73–7.14	0.158
Often	68	1.00	---	
Monthly food stamps duration				
< 4 wks	74	7.74	2.36–25.37	0.001
4 wks	75	2.14	0.77–5.95	0.147
No food stamps	43	1.00	---	

¹Final model. Variables dropped from model after backward stepwise elimination procedures: Hispanic church attendance, car ownership, ever homeless as adult, exchange services with family/friends, child's age. Hosmer-Lemeshow model fitness: chi-square=5.44, df=8, p=0.71.