

An Exploratory Study of Local Food Affordability and Factors Related to Household Food Security and Food Purchasing Decisions

R Chambers

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Abstract

Objectives: This study examined food affordability in Las Cruces, New Mexico and piloted instruments to explore factors in household food security and purchasing.

Methods: Affordability was assessed at three retailers using the USDA Food Store Survey Inventory and Thrifty Food Plan index. Ninety-eight shoppers completed the short form of the USDA Household Food Security Scale, and two tools developed for the present study. Fischer's Exact Test was used to determine independence of food security status in relation to each variable of interest.

Results: One retailer was affordable for families with young children; two were affordable for families with older children. Marital status was related to household food security. Some families classified as food secure according to USDA protocol reported not purchasing needed foods because of cost.

Conclusions: There is room for community health promotion efforts to focus on helping divorced families maintain food security and for rethinking food security classification.

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INTRODUCTION

Many factors influence food choice. Preference is a major reason for choosing certain foods over others (₁), but far from the only reason. Given that food preferences develop during early childhood (₂), even our tastes may not be under our control, and other factors are even less likely to be personally controllable.

Because food choices are important for individual and population health, the federal government has developed educational materials for the public, and nutrition information standards for the food industry. Recent years have seen the design and implementation of federal dietary guidelines; laws mandating food label content; and other

laws designed to increase public awareness of nutritional issues. In 1980, the US Department of Agriculture (USDA) and the US Department of Health, Education, and Welfare (now the US Department of Health and Human Services [US DHHS]) established the first dietary guidelines for the nation (₃). The newest edition emphasizes a semi-personalized approach to diet (₄), offering consumers even more information with which to make healthy decisions.

With information, though, has come less activity for most Americans and an increasingly processed diet marketed to our desires for familiar, easily prepared, and tasty food. The food industry devotes 20 times the USDA education expenditure to advertising, primarily promoting processed and packaged foods (₅). While some may argue food choices remain personal choices, this imbalance obviously influences those choices.

Food choices, and barriers people face regarding them, are more critical than ever. In the United States, 65% of adults were overweight or obese in 2002 (⁶). No distinction is made between obesity and overweight in children; however, between 1999 and 2000, 15% of children (aged 6 to 11) and 15% of adolescents (aged 12 to 19) were overweight (^{7, 8}). The number of overweight adults and children, with accompanying risks of chronic disease, has increased dramatically in the past four decades, with most of the change since 1990 (^{9, 8, 7}). This rapid change and concurrent research findings suggest that environment may be more influential than genetics (^{10, 11, 12}).

In light of easy access to nutrition information, poor food choices by a majority of the population likely reflect other factors. While dietary problems are not limited to people of low socioeconomic status, diet-related diseases increasingly are recognized as health disparities (¹³). Thus, exploring socioeconomic factors and associated barriers may help to inform new interventions.

In a rich country with relatively low unemployment, inadequate access to nutritious food might seem irrelevant in public health campaign outcomes. However, the federal government has been monitoring this misunderstood problem for more than a decade. The Household Food Security Scale was developed in 1990, and first used in 1995 by the US Census Bureau (¹⁴).

The Healthy People 2010 goal of food security for 94% of US households (¹⁵) confirms that problems surrounding food access might exist. Food insecurity, faced by individuals or households, is defined as “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways” (¹⁶).

Recognizing households' differing food purchasing capacities, the USDA's Center for Nutrition Policy and Promotion [CNPP] designed four indices to assess affordability of household food costs, based upon amounts of specific foods needed for individuals and for two- and four-person households; each is updated monthly according to the Consumer Price Index for the specific foods (¹⁷). The Thrifty Food Plan [TFP] represents the lowest possible cost of a diet meeting dietary guidelines, assuming that all meals, snacks, and desserts are home-prepared (¹⁷). Researchers can compare a given month's TFP with food prices at local food retailers, estimating the difference between the USDA-

projected cost and the amount a local household would need to spend for a diet meeting the guidelines. If USDA-projected costs are substantially lower than actual food costs, vulnerable households may face food insecurity.

Household socioeconomic status and practical access to foods may present barriers to purchasing an adequate diet. The study described represents an effort to determine the affordability of a healthy diet in Las Cruces, New Mexico, and to develop and pilot two instruments to explore household socioeconomic situations as they might influence household food security status and purchasing decisions.

SIGNIFICANCE

Health disparities stem from structural problems, including relative poverty, social exclusion, and limited opportunity (¹⁸). Poverty rates in this country are higher than for most other industrialized nations, and child poverty rates have continually worsened since 1970 (^{19, 20}). Thus, for U.S. public health efforts to be effective, health promotion, not merely health education, must become the standard. The described study was focused on developing and piloting two instruments to explore external factors as variables in households' capacities for optimal nutrition. Measures of U.S. household food security have examined income and marital status, but not education levels, perceived adequacy of nutrition information and cooking skills, or household access to vehicles – all of which might be of interest in determining root causes of food insecurity.

Robertson, Brunner, and Sheiham (²¹) argued that improving food choices will involve all aspects of the food system. Unfortunately, as the magnitude of food industry advertising indicates, corporations do everything possible to make unhealthy foods the easy choices. This factor, with the impacts of politics, economics, socioeconomic status, environment, and science and technology, makes it imperative to explore the possibilities for effective nutritional health promotion as they relate to barriers faced by individuals.

New Mexico is among the poorest states in the nation and Doña Ana County is one of its poorest counties (²²). Thus, Foley's and Pollard's (²³) suggestion that health promotion efforts often are least accessible by the poor provides an added incentive for public health professionals in New Mexico to determine other factors and health promotion methods with the potential to affect long-term health outcomes.

Until recently, New Mexico was the most food insecure state in the nation (²⁴ , ²⁵), and it continues near the worst in child poverty (²⁶ , ²⁷). Exploring households' food procurement barriers, food security status, and the adequacy of food regularly purchased by local households with children may help health promotion efforts be more responsive to communities' situations, and thus more effective for child health outcomes. Las Cruces' population is the second largest in the state (²⁸). Knowing the factors influencing food choices for some Las Cruces households might help in exploring these factors for a large proportion of New Mexico's people.

The study was intended to address the following research questions. Is a USDA-adequate diet affordable in Las Cruces? Are there relationships between household food security status and shopper-reported education level, marital status, nutrition-related information, "most important factor" in making food purchasing decisions, and lack of household vehicle? Do shoppers answering one food security scale item positively report foods needed but not purchased more frequently than shoppers who do not? What is the relationship between household food security, income, and dietary variety (indicated by foods purchased Always or Often on the Food Inventory Profile)? Can instruments be designed to explore factors associated with household food security status and food purchasing decisions?

The food cost survey was limited to three Las Cruces stores. It was assumed that current local non-sale prices for a USDA-adequate market basket accurately represented the cost of purchasing these foods. Additionally, it was assumed that persons receiving packets completed the packets; that participants answered questions accurately; that participants had some knowledge of generally available nutrition information; and that participants could read English.

THEORETICAL FRAMEWORK AND PURPOSE

The present study was based on the social ecology model of health and wellness promotion (²⁹), taking into account individual, interpersonal, community, and societal factors in exploring health problems and their solutions. Green and Kreuter (³⁰) discussed social ecology as referring "less to the physical environment than to the dynamic social forces operating on the situation and the population" (p. 27), and recognized the reciprocal relationship between person and environment. Ecological approaches move beyond health education, incorporating tools to help people take charge of

their own health. Recently, public health efforts have begun to shift from a focus on psychosocial factors to external factors such as availability, accessibility, skills and laws, and attitudes and behaviors of others including peers, health professionals, and employers. The current study was designed to assess the affordability and availability of food and to explore the possibility of creating tools with which to describe the social ecology of household food purchasing decisions in Las Cruces, New Mexico.

METHODS

SAMPLE

The Institutional Review Board at New Mexico State University approved the study protocol. A convenience sample of 98 participants was recruited in February and March, 2003 via intercept interviewing (³¹) at two Las Cruces food stores. Price and availability data were collected from the three retailers on February 22 and 23, 2003, and were compared to the Thrifty Food Plan (TFP) index for February 2003.

INSTRUMENTS

Instruments were a modified version of the Short Form of the Household Food Security Scale (¹⁶); a Household Shopping Profile; and a Food Inventory Profile. The last two were new instruments, designed for pilot-testing in the study. As such, their validity and reliability are not known, but face validity was determined by having the instruments reviewed by three faculty members who are proficient in survey research and familiar with nutrition information. Validity was further assessed by the analysis of participant item responses, comments written on the instruments themselves, and comments made on a Participant Feedback form that directly solicited participant input. These comments were used to revise the two instruments. Reliability was assessed by calculating Cronbach's alpha, .65 standardized for the Household Shopping Profile, and by analyzing the comments received regarding the Food Inventory Profile.

To assess local food affordability, food costs at three retailers were surveyed using the Food Store Survey Instrument (FSSI) (³²), a list of 87 foods in 14 categories designed to reflect a "market basket" related to the Thrifty Food Plan. Using this instrument provides a snapshot of food affordability and access as indicators of community food security (³²).

The Household Shopping Profile (HSP) contained 21 items to assess household demographic factors possibly associated with food purchasing decisions and food security status. Based upon a review of the literature, household size, household income level, vehicle access, nutrition knowledge and cooking skills, and kitchen facilities appeared to be relevant factors.

The Food Inventory Profile (FIP) is designed to assess household shoppers' estimates of their food purchases. FIP foods and categories are representative of the Food Guide Pyramid, and might be more similar to an everyday shopping list than FSSI foods. For example, the FSSI includes baking powder, reflecting the USDA's assumption that families shopping within the constraints of the TFP will prepare all meals, desserts, and snacks at home (¹⁷). In contrast, FIP foods were chosen based upon the assumption that families purchase prepared snacks and desserts more often than they prepare these foods. For families experiencing constrained food choices due to financial considerations or otherwise, time available for baking may be limited. Thus, items such as baking powder, sugar, and spices were not included in the FIP. It was hoped that making these changes would result in an instrument that would more closely reflect participants' practices.

The 6-item short form of the Household Food Security Scale (hereafter food security scale), (¹⁶) was chosen to lessen respondent burden and facilitate self-administration. Its reliability in measuring household level food insecurity is very similar to that of the long form (¹⁶). Permission to reformat the instrument for ease of self-administration was obtained (M. Nord, personal correspondence, January 24, 2003). The short form contains six items regarding households' access to adequate food. Response choices are, depending upon the question, "Always True," "Sometimes true," "Never true," or "Don't know/Refuse to answer;" "Yes," "No," or "Don't know/Refuse to answer;" or "Almost every month," "Some months, but not every month," "Only one or two months," or "Don't know/Refuse to answer."

DATA ANALYSES

Of 98 participants recruited, 67 returned survey packets. Analyses were conducted using SAS version 8 (SAS Institute Inc. Cary, North Carolina). Fisher's Exact test was used to determine independence of food security status in relation to each variable of interest.

A study limitation was that income was reported as a

household size and income category combined choice, and that the income categories in the response choices (HSP question 4) were broad. The decision to offer category choices was made to increase income item response. Income categories were based upon the 2003 Federal Poverty Guidelines (³³). Based upon these guidelines, categories represented incomes from (1) poverty level to (5) 300% of the poverty level or higher.

Because some participants did not answer all items, counts and percentages may vary. All counts, percentages, and statistics were calculated on an item-by-item basis, and thus may or may not represent the total sample of 67 participants. Additionally, ethnicity and gender were not used as variables for analysis.

RESULTS

PARTICIPANTS

Participants were 49 females and 18 males stating that they had primary food shopping responsibility for their households. Ten were single, 13 reported living with someone, 33 were married, 8 were divorced, and two widowed. One participant did not report marital status. Seven participants lived alone, 25 in 2-person households, 16 in 3-person households, 10 in 4-person households, and 9 in households with five or more members. Twenty-three were college graduates, 21 had completed some college, 16 were high school graduates, 5 had not completed high school, and 2 had not attended high school. Fourteen participants reported income category 1, five category 2, nine category 3, fourteen category 4, and 17 category five.

FOOD AFFORDABILITY

Data were collected from the three retailers on February 22 and 23, 2003, and were compared to the Thrifty Food Plan (TFP) index for February 2003. Store 1 is a large discount retailer, and Stores 2 and 3 are supermarket chains. The weekly TFP budget, during February 2003, of a USDA-adequate diet for a family of four (children aged 2 to 5 years) was \$93 (¹⁷). For a family of four with children 6 to 11 years old, the weekly budget for this diet increased to \$107.70 (¹⁷).

The cost of TFP-recommended food at Store 1 was \$87.31. At Store 2, the total cost was \$94.23, and at Store 3, the total was \$111.57. Thus, for a family with children under the age of 6, Store 1 was the only affordable option based upon the February 2003 TFP index. A family of four with children

aged six to eleven could afford the recommended foods at stores 1 and 2, but not at Store 3. Cost differences by store were found within food categories, and for some categories Store 3's costs were lower than at stores 1 and 2. However, overall higher food costs at Store 3 resulted in higher total food cost for the TFP market basket.

HOUSEHOLD FOOD SECURITY

Of 67 survey packets returned, 5 food security instruments were not completed. According to USDA protocol, households with zero or one positive response were scored FS (Food Secure), households with two or three positive responses were scored FI (Food Insecure), and households with four or more positive responses were scored FIH (Food Insecure with Hunger) (¹⁶). Of 33 food security scales received from Hispanic participants, 21 (63.6%) were coded as FS, 7 (21.2%) as FI, and 5 (15.2%) as FIH. Of 29 received from non-Hispanic participants, 19 (65.5%) were coded as FS, 8 (27.6%) as FI, and 2 (6.9%) as FIH. Overall, of 62 SFHFSS received, 40 (64.5%) were coded as FS, 15 (24.2%) as FI, and 7 (11.3%) as FIH.

To explore the relationship between food security, income, and food purchasing decisions, variety of food purchased was compared for participants coded as high income, food secure; high income, food insecure; low income, food secure; and low income, food insecure. Table 1 presents food security status by income category, and Table 2 presents variety of foods purchased by food security and income categories.

Figure 1

Table 1: Food Security Score by Lower- and Higher-Income Categories

SFHFSS	Income Category 1 or 2		Income Category 4 or 5	
	(N)	%	(N)	%
FS	9	50.0	21	77.8
FI	4	22.2	5	18.5
FIH	5	27.8	1	3.7
Total	18	100	27	100

Figure 2

Table 2 : Variety of Food Purchased by Income and Food Security Category

Mean Food Items, by Category	FS, Higher-income Households	FI, FIH Higher-income Households	FS, Lower-income Households
	μ	μ	μ
Fruits	8.3	4.0	3.8
Vegetables	10.7	10.2	9.3
Grains	8.4	7.2	6.1
Meat Alternates	2.7	1.7	2.4
Dairy	3.7	3.8	2.8
Meat	9.0	5.8	7.3
Fish	0.5	.7	3.0
Miscellaneous	7.0	3.8	5.8
Other	.1	0	.4
Total	50.4	37.2	40.7

While a household scoring 1 is considered food secure, a positive response means choosing “Sometimes True” or “Often True.” Thus, it is doubtful whether a participant answering even one item positively would consider his or her household food secure. Given this potential discrepancy between official food security status and household reality, it was thought that households with one positive response might differ from households with none, even while being deemed officially food secure. Fisher's Exact test was used to determine if participants answering one food security item positively reported foods needed but not purchased due to cost more frequently than participants answering zero items positively. Of the 40 households coded as FS, 10 (25%) had responded positively to one food security item.

The Fisher's Exact score for the above research question was <.01, when food insecure households were included. The difference was seen between households scoring 0 and households scoring 2 or greater, with no difference detected between households scoring 0 and households scoring 1. Thus, not purchasing needed foods because of cost was independent of a food security scale score of 1. However, as shown in Table 3, 60% of households with a score of 1 reported not purchasing needed foods due to cost.

Figure 3

Table 3 : Food Security Score by Foods Needed but not Purchased

Food Security Score*	Foods Needed, not Purchased		Purchase All Needed Foods	
	(N)	%	(N)	%
1	6	60.0	4	40.0
0	5	16.7	25	83.3
FI	15	68.2	7	31.8
Total	26	41.9	36	58.1

* Number of missing observations: 5

Only 16.7% of households with a score of 0 reported this experience. Similarly, 40% of households scoring 1 reported that they purchased all needed foods, while 83.3% of households scoring 0 reported that they purchased all needed foods. Thus, a case may reasonably be made for examining further the appropriateness of categorizing households with a score of 1 as food secure.

HOUSEHOLD SHOPPING PROFILE

All returned packets contained HSPs that were complete, or nearly complete. Of its 21 items, six addressed variables (education, marital status, nutrition information, most important factor in food purchasing, foods needed but not purchased, and vehicle availability) thought to be of interest in relation to food security score. Fisher's Exact Test ($p < .01$) indicated a relationship between marital status and food insecurity, as shown in Table 4.

Figure 4

Table 4 : Food Security Score by Marital Status

Food Security Score*	Single		LWS or Married		Divorced		Widowed	
	(N)	%	(N)	%	(N)	%	(N)	%
FS	5	50.0	34	75.6	0	0	1	100
FI	3	30.0	8	17.8	4	66.6	0	0
FIH	2	20.0	3	6.6	2	33.3	0	0
Total	10		45		6		1	

* Number of missing observations: 5

Food security status was found, for this sample, to be independent of the 5 other variables.

DISCUSSION

Effective instruments to explore factors associated with household food security status and food purchasing decisions can be developed, particularly when participant feedback is solicited. Using this feedback to refine these

instruments so that they reflect community realities and allow participants to describe their experiences of food insecurity and constrained food purchasing decisions may improve their usefulness as exploratory tools.

Variety is a major characteristic of a healthful diet (⁴). Thus, exploring the strategies used by lower-income households to maintain a varied diet may offer information for public health professionals attempting to improve population dietary practices. The issue of limited variety in the diets of nominally food secure households is of potential concern as well, particularly if these households might perceive themselves to be food insecure no matter their official labels.

The possibility of a relationship between divorce and household food insecurity has been discussed in other research (³⁴) and confirmed in this study. Given the prevalence of divorce in the United States, public health professionals should explore ways to assist divorced households in maintaining food secure status.

IMPLICATIONS FOR PUBLIC HEALTH PROFESSIONALS

Food insecurity in a wealthy society such as the United States is a complex, multi-factorial problem, and one that should be addressed by strategies that take into account the various levels and settings within which it occurs. An effective health promotion campaign surrounding food choices might take into account such ecological factors as price, availability, transportation access, food preparation and preservation skills and facilities, literacy, and time not devoted to the pursuit of paid employment (³⁵). Such a campaign might teach its audience quick, easy, and healthy food preparation, as well as advocacy skills necessary to exercise community power and enter into dialog with local stores, and work with neighborhoods to develop systems of social support. While health education campaigns assume complexity based on "market segmentation" but simultaneously aim to generalize strategies across various regions, nutrition-oriented health promotion efforts might be more likely to succeed if tailored to specific communities and even neighborhoods.

Health promotion efforts may need to include situation-specific approaches as a matter of course, rather than as exceptions to general practice. Schorr (³⁶) cited research into "best practices" of antipoverty programs:

the working group found very little that held true regardless of context. At their core, “successful programs recognize and respond to the needs of the community; they reflect the character of its people; . . . they build capacity in people and in neighborhoods . . .” The council concluded “best practices are whatever works in a given context.” (pp. 7-8)

Such programs would necessarily entail complicated assessment and planning stages, but would likely produce long-term, sustainable food security solutions.

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Author Information

Rebecca L. Chambers, MPH, CHES

Doctoral Fellow, Health Science, Department of Health Science, Kinesiology, Recreation and Dance, University of Arkansas