Understanding the Experience of Food Insecurity by Elders Suggests Ways to Improve Its Measurement[1]

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ABSTRACT A full conceptualization of the elderly food insecurity experience has been lacking, leading to limitations in the definition and measurement of food insecurity in elders. Based on the qualitative analysis of two in-depth interviews 6 mo apart with each of 53 low income urban elders, using principles of grounded theory, the experience of elderly food insecurity was shown to have four components: quantitative, qualitative, psychological and social. The inability to obtain the right foods for health is a new element specific to elders. Common to each of these components were dimensions of severity, time and compromised food choice. Although money is a major cause of food insecurity, elders sometimes have enough money for food but are not able to access food because of transportation or functional limitations, or are not able to use food (i.e., not able to prepare or eat available food) because of functional impairments and health problems. These findings suggest that augmentation of the U.S. Household Food Security Survey Module (FSSM), a national measure of food insecurity based on research in younger persons, may result in more accurate assessments for elders. We developed 14 new items for possible augmentation and administered them by telephone to these same elders along with the FSSM. Elders were independently classified according to food insecurity status based on their experience from the in-depth interviews, and these definitive criteria were used to evaluate the new and existing items. The results suggest that "couldn't afford right foods for health" and two policy-relevant immediate causes, "couldn't get the food I needed" and possibly "unable to prepare," should be added, although further testing is needed. J. Nutr. 133: 2762–2769, 2003.

KEY WORDS: • *food security* • *elderly* • *hunger* • *measurement*

Food security is an essential dimension of health and well-being. The deprivation represented by food insecurity and hunger is not only undesirable in its own right, but also can contribute to poor health and nutrition, particularly in elders (1–5). Measurement of food insecurity is an important part of understanding and assessing nutritional problems (6,7). Food insecurity is a complex multidimensional phenomenon 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" (6). Because assessing dietary intake does not capture the uncertainty and other experiential aspects of food insecurity, the U.S. Household Food Security Survey Module (FSSM), a set of direct questions about various aspects of the food insecurity experience that includes key elements of this definition, was developed (8).

Based on the Current Population Survey using the FSSM, 17.5% of low income elderly households and 7.1% of all elderly households were estimated to be food insecure in 2000 (9). The accuracy of this estimate for elders is questionable, however, for two reasons. First, the research that guided development of the FSSM was based primarily on families with children (10,11); however, the experience of food insecurity in elders is likely to be somewhat different. Previous research has shown that past experience such as food deprivation during the Great Depression greatly affects elders' perception of food insecurity (12,13), which is likely to affect how they respond to food insecurity questions (12). Our previous research also suggested that anxiety related to accessing food for health is a more important part of the experience of food insecurity in elders than in younger people (14). In addition, the FSSM only assesses food insecurity resulting from financial resource constraint, i.e., food insecurity caused specifically by not having enough money for food. However, food insecurity in elders due to other causes such as limited mobility and transportation may also be important to assess (12,15,16).

As the elderly population increases, an accurate assessment of the extent of food insecurity becomes more important for program and policy decisions. Because a valid measure requires well-grounded construction (17), an in-depth understanding of elderly food insecurity is essential. Two previous studies

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provided some understanding of elders' food insecurity experience, but both had some limitations. Our previous study focused on contributing factors (12) and how food insecurity progresses in severity (14), but did not provide sufficient depth about the nature of the experience itself and was limited to one interview each with 19 rural Caucasian and 16 urban African-American elderly households. Another study provided a detailed description of food insecurity in rural elders in North Carolina, but not a conceptualization that is directly applicable to measurement issues (13). Thus, a fuller, more complete conceptualization of the experience of elderly food insecurity, from which understanding can contribute towards measurement issues, is needed.

This research extends our previous work by focusing on the nature of the experience itself. It is strengthened by the use of two interviews per participant, and in addition is expanded to two cultural groups not previously studied in depth in relation to food insecurity: urban Caucasian and urban Latino elders. The purpose of this study was to *1*) understand the food insecurity experiences of elders, *2*) develop a conceptualization of the experience of elderly food insecurity based on this understanding, *3*) examine implications for definition and measurement, including whether the FSSM has the items necessary to measure food insecurity in elders and *4*) develop and evaluate new questionnaire items as needed.

METHODS

Qualitative sample. A sample of 46 elderly households was selected from three large cities in upstate New York using purposive sampling (18). Elders were recruited through subsidized housing programs, churches, congregate and home-delivered meals programs and a Latino community worker. Program contacts were asked to refer clients who were particularly in need and might be experiencing food problems, and for a diverse sample, to select elders varying in age, sex, mobility, food programs used and spousal status. The final sample included 25 Latino (primarily Puerto Rican) elders living in one large city (20 households) and 28 nonLatino elders living in two large cities (26 households). This sample size was deemed adequate based on our previous research, and appeared to provide informational redundancy and theoretical saturation (19).

In-depth interviews. Two in-depth interviews, ~6 mo apart, were conducted with each participant between December 1999 and July 2000. Ten households included elders who were married or living together. Of these, seven couples were interviewed together, while only one member of each of the other three couples was interviewed. The nonLatino sample was interviewed by one of the authors experienced in qualitative interviewing (P.V.). The Latino interviews were conducted in Spanish by a local Latino community worker, who was trained by the authors in qualitative interview techniques. The 45–90-min interviews were conducted in participants' homes and were tape-recorded. Interview transcripts were supplemented by written notes. Signed consent was obtained and participants were paid 10 dollars per interview.

A semistructured interview guide consisting of open-ended general questions about participants' food situation was used to conduct each interview. Emphasis was placed on learning what was important to the participant, and on gaining the participant's perception of his or her world, including the language or terminology used (20). Elders were asked about what they usually ate, their eating environment, how food preparation and grocery shopping were done, influences on their food situation and experiences of difficulty getting food. The second interview guide was developed based on the initial analysis of the first set of interviews. It included questions about general issues that arose and also individualized questions to gain depth, clarity and confirmation on specific issues that emerged from each participant's first interview. Both interview guides were translated into Spanish by an experienced Puerto Rican Latino. The first guide was pretested with both Latino and Caucasian elders and modified to make it more understandable and culturally appropriate.

Qualitative analysis. Each in-depth interview was transcribed verbatim. The Spanish interviews were transcribed in Spanish and then translated by a Puerto Rican Latino translator from the community. As an additional check, a second Puerto Rican Latino translator listened to each tape and edited the translations, noting where different interpretations occurred. Interview transcripts were then broken down and coded as quote segments that were as small as possible while still remaining meaningful (21,22). Analysis proceeded using the principles of grounded theory (23) with the coded units sorted and each set of related quote segments compared and categorized. Qualitative analysis strategies based on the constant comparative method were used to interpret meaning, examine themes that emerged and draw conclusions (22,24). Text analysis and interpretation were facilitated by the qualitative data analysis software Atlas 4.1 for Windows (Scientific Software Development, Berlin). Peer debriefing by the three researchers and the Latino interviewer was used to ensure trustworthiness (25). Writing, developing the conceptual framework and data analysis proceeded in an iterative fashion.

Development of new items and telephone survey. Results from the qualitative study were used to conceptually determine what aspects of the elderly food insecurity experience were not captured by the currently used FSSM (see Results). On this basis, 14 additional elderly-specific items were developed to augment the FSSM. These items were constructed using the wording and phrasing of the elders themselves as much as possible, keeping the same question or statement format of the original items. These new items and the eight nonchild FSSM items were administered by telephone to 48 of the 53 participants (all who were able to be recontacted) between December 2000 and February 2001, ~1 y after each first in-depth interview. The questionnaire was translated and administered to the Latino elders in Puerto Rican Spanish after pretesting with five Puerto Rican adults. Translations for the FSSM items were adapted from seven different Spanish versions, five compiled by a working group developing a nationally standardized Spanish language version (26), one from the Boston Medical Center (Jennifer Kasper, personal communication, 7/5/00) and one from the University of Connecticut (Rafael Perez-Escamilla, personal communication, 6/30/00). Newly developed items were translated in a manner consistent with the FSSM translations.

Classification and analysis. For comparison with the augmented measure, participants were classified by food insecurity status based on what they experienced during the prior year as described in their two in-depth interviews. Each participant was rated as food secure (1.0) or as having experienced mild (2.0), moderate (3.0) or severe (4.0) food insecurity. They were first rated for each component (**Table 1**) based on our conceptualization, and then by overall averaging. These ratings were done independently by each of three researchers blind to the outcome of the telephone survey. When differences in scoring occurred, consensus was reached in each case after a brief discussion. This consensus method was previously found to reliably yield highly accurate classification (27). This food security classification was used as a definitive criterion against which to quantitatively compare the responses for the augmented and original FSSM items from the telephone survey, both individually and using a score of overall food insecurity based on just the FSSM items defined as a positive response to one or more of the eight items. Comparisons were made using two statistics. One statistic was the difference between mean food insecurity status based on in-depth interviews (i.e., the qualitative classification, scored from 1.0 to 4.0 in 0.5 increments) for those who answered yes versus no to each item (with often and sometimes collapsed to yes, and with don't knows collapsed to missing). The second statistic was gamma (28), which is based on counting concordant and discordant pairs for ordinal data (i.e., item response versus qualitative classification). Specifically, it is the difference in the number of concordant and discordant pairs divided by the total of them, and is interpreted as the difference in the probability of like rather than unlike orders for the two variables when two individuals are chosen at random.

RESULTS

Sample characteristics. All but 7 of the 46 households were living in subsidized housing, as is common for low income

TABLE 1

Components of the experience of elderly food insecurity that emerged from the in-depth interviews

Component	Description
Quantitative	Least severe: Food depletion (low food stocks but adequate calories) More severe: Having to eat less food than usual Most severe: one or more days without food, actual "hunger"
Qualitative	Least severe: Having to buy and eat less-preferred foods (not actual food insecurity) More severe: Having to eat a nutritionally inadequate diet Most severe: Not able to eat the right food and meals for health
Psychological	Knowledge and perception of food situation, how they feel about it: Uncertain food situation and not right foods for health lead to feelings of worry and anxiety (severity indicated by amount/degree of worry and anxiety) Lack of choice and need to make compromises lead to feelings of deprivation and embarrassment
Social	Accessing food in socially unacceptable ways: Having to rely on a food pantry (less severe) Buying food on credit (less severe) Having to ask others for food or meals (more severe) Borrowing money for food (more severe) (severity also depends on frequency) Socially or culturally less normative patterns of eating

urban elders. Over half were women living alone; one-fourth (mostly Latinos) were living as couples. Most elders had at least one chronic health problem such as obesity, diabetes, heart disease and/or arthritis and almost one-fourth had some mobility limitation. The Latino sample was slightly younger, with poorer health but fewer mobility-limiting disabilities than the nonLatinos. Mean age was 71 y, ranging from 53 to 88 y. The majority were aged 65 y or over (including all but two of the nonLatinos); all but four (three Latinos, one the spouse of an older participant, and one Caucasian) were aged 60 y or over. Although adults in their 50s and early 60s are not usually considered elders based on their age, our contacts recruited those they considered to be elders sometimes without knowing their ages. Therefore we use the term elders here, but do not define it based solely on age.

All but 4 of the 53 participants had worked most of their lives. The Latino sample had very little education (only one had finished high school, one-half had not completed seventh grade) and very low income (average $6,536/y), whereas the nonLatino sample had somewhat higher education (one-fourth had education beyond high school, one-third had education less than high school) and income (average $9,060/y). Of the 20 Latino households, nine received food stamps (all but one at only $10/mo), five used food pantries, one participated in congregate meals and eight did not participate in a food program. Of the 26 nonLatino households, four received food stamps, six received home-delivered meals, four participated in congregate meals, three used food pantries and 14 did not participate in a food program. Although contacts were asked to recruit Caucasians for the nonLatino sample, two African-Americans were inadvertently recruited and included, one male and one female each living alone.

Conceptualization of the experience of elderly food insecurity. Ten themes related to the conceptualization of food insecurity emerged from the elderly participants' descriptions of their experiences: lack of money for food, not enough food due to transportation limitations, not enough food due to health or mobility limitations, not the right foods for health including health-related dietary requirements, financial priorities (food versus other expenses), food compromises (quality and quantity), strategies for accessing food (e.g., borrowing money, using food programs and food trade), lack of motivation to cook or eat, perception of adequate food for health (quality and quantity) and worry or anxiety about their food situation. Further analysis of the data focused on understanding the experience of food insecurity, which was found to have four components: quantitative, qualitative, psychological and social (Table 1).

Quantitative component. The quantitative component of elderly food insecurity relates to the actual amount of food and energy able to be accessed and consumed. It ranges from reduced food stocks to having to eat less food than usual, which if continued can result in actual hunger.

The less severe level is food depletion, i.e., less food stocks in the home than desired or than needed to put together a meal, but the actual amount of food or calories eaten is not yet decreased. Examples included eating oatmeal or plain rice for dinner or running out of vegetables. Food depletion is a concern because it often results in compromised quality, socially less acceptable meals and worry.

More severe is having to eat less food than usual or insufficient intake. The following quotes, all from elderly Latinos, illustrate this: "With all of my expenses . . . sometimes I have to go to bed without eating, [but] I am used to it." "Usually around this time [of the month] I don't have enough. Right now I don't have groceries here. I have to wait for my daughters to offer or give me something." (diabetic woman) "Today I don't have it, I don't have anything to eat a good lunch or dinner . . . I have to wait for the check that I get weekly so that I can go and buy [some food]. Sometimes I don't get the check on time and I don't have anything in the house." "There were times that if we found [food] for lunch we didn't have [food] for dinner. Sometimes [our daughters] would help us. They would give us a loaf of bread and they would help us with a little bit of food . . . It is sad and painful. Sometimes we run out of things towards the end of the month."

The most severe level of quantitative food insecurity is actual hunger or going one or more days without food, which includes physiological feelings of hunger and can result in weight loss. Although several had experienced such hunger in the distant past, only a few had experienced it recently. As one disabled elderly Caucasian woman described it, "I've gone a couple of days without eating . . . I've had to put a little brown sugar into some warm water and I drank that both days, a couple of times." Another Caucasian participant noted, "I don't think I go hungry any time now. You know I haven't for the last 14 months."

Qualitative component. The qualitative component of elderly food insecurity relates to the quality of the diet. The least severe level is having to buy and eat less-preferred foods (e.g., canned rather than fresh produce), but we did not interpret this as actual food insecurity. The more severe level is having to make compromises that result in a nutritionally inadequate diet: "No, I wouldn't say I didn't have enough to eat. I would say that I didn't eat properly. I didn't eat the right things." Many mentioned not being able to afford meat, which often resulted in a nutritionally inadequate diet consisting primarily of starches, e.g., eating "a lot of pasta and rice because that's a

lot cheaper." Another commented, "I buy the medication first. I cook macaroni and put some sauce on it . . . No protein, you know, not enough protein."

The most severe level, and one that appeared to be more specific to elderly than to younger adults, was not being able to eat the right food and meals for their health. Most participants had at least one chronic health problem, and eating the right food and meals for their health was very important. One Latino woman noted, "My doctor tells me to drink lots of milk and eat cheese and fruits, but it becomes hard to get enough fruit because I have to choose between buying fruit, milk and cheese. If I buy fruit I won't have enough for milk and cheese." Another commented, "There isn't enough money to buy healthy food . . . so we have to eat things that are bad for us rather than the ones that are good for us . . . because we are hungry." A bedridden woman commented, "As far as red meats, you know, nutritious fruits and vegetables, which is what I really am supposed to have, I couldn't begin to afford . . . I'm not supposed to have salt but I cannot live like that because my budget does not permit it."

The inability to access the right quality and types of food for the elders' specific health problems or overall health and well-being caused great anxiety and often exacerbated health problems. For example, many elders had diabetes and were keenly aware of the importance of diet for control of the disease and its symptoms, yet could not afford to eat the way they should. A diabetic Latino woman noted, "Since I don't have enough money to buy what I should eat, sometimes I have to eat things that aren't good for me and sometimes my blood sugar is too high." Similarly, an African-American man commented, "My diabetes and my blood sugar is out of control and when you don't eat right most of the time it does get out of control . . . Sometimes I do eat [and] buy the cheaper stuff because I [have to buy] medication. I would buy the medicine and eat whatever I had in the house."

Psychological component. The psychological component of food insecurity refers to the elders' knowledge and perception of their food situation and how they feel about it, and includes two subcomponents. First, knowing and perceiving the uncertainty of their food situation and lack of the right foods for health leads to feelings of worry and anxiety. Examples include feeling desperate about not being able to shop for food because their usual help was not available (e.g., daughter working now or sick herself), feeling scared about not being able to afford both food and medication because unexpected expenses arose, worrying about not having enough to eat and most prevalent and again more specific to elderly than younger adults, worrying about not being able to eat right and the impact of this on their health. "A diabetic is supposed to eat three meals a day and something before going to bed but sometimes I don't have the three meals and that makes me worry." "I worry a lot because of nutrition and health. I don't have the money to buy what I need." (Latino man)

Second, knowing and perceiving their lack of food choice and the need to make compromises leads to feelings of deprivation, anger and embarrassment. For example, an elderly Caucasian man living alone ran out of money at the end of each month and bought a daily meal on credit at a local diner, but the owner gave him limited options such as a hot dog rather than a hamburger, making him feel deprived. Others were angry at having worked so hard all their lives and finding themselves in a difficult food situation, embarrassed about going to food pantries to get food and too proud to ask for help. For example, a Caucasian woman said, "I would go without before I would ask . . . All my life I worked so hard to get the things that I have. And to think that I had to live this way now . . . . I was too prideful to ask my kids and then I finally had to."

Social component. The social component of food insecurity also includes two subcomponents: *1*) accessing food in socially unacceptable ways and *2*) socially or culturally less normative patterns of eating. Socially acceptable and normative patterns are based on commonly accepted social norms, whether or not they are perceived as acceptable by a given elderly person.

Socially unacceptable ways to access food included using a food pantry and buying food on credit (both less severe), and asking others for food or meals and borrowing money for food (both more severe). These experiences often led to feelings of embarrassment, hurt pride and loss of independence. One Latino woman cried as she described a difficult time she had experienced recently: "This past Thursday I went [to the food pantry]. I needed food . . . I froze and had a terrible headache and pain in my body. I was nauseated, dizzy. So many people there, waiting, freezing . . . I was there from 9:00 in the morning until 11:00 before they gave me my package. I went dressed very warm. When I went inside to get my little package, the people working there had to cover me up because I could not feel my lips nor my nose nor my hands. I suffered a lot." Many were reluctant to ask others for food or meals, even their own relatives or children. "Sometimes I don't have anything here and I don't want to tell my children that I am in that situation. I'll go to some of the Sisters' apartments from church and they offer me food and that's how I can get something to eat." Others did not feel they could ask their church for money even for food. Several Latinos described having to borrow money for food, sometimes from a "friend" who charged them 20% interest; one said that doing so made him feel "rebajado" or "lowered." Some elders routinely bought food on credit at the end of the month when they ran out of money for food. Several Latino elders described buying food on credit (with no interest) from a local Latino grocer, even though the food cost more than it would at a larger supermarket.

Socially or culturally less normative patterns of eating refer to the content of meals, the types of foods eaten, whether they are culturally appropriate and when and whether meals are eaten (e.g., having to skip meals). A less severe example is having to eat sandwiches for dinner instead of a "real" meal. A more severe example was described by a very low income bedridden woman living with her grandson: "I will eat a spoonful of peanut butter with my pasta. I will put that on the side of the plate. And even crunchy peanut butter mixed up with pasta is not a bad thing. It sounds horrible but you know it's quite tasty." Many Latino elders had difficulty accessing or affording culturally appropriate foods (sometimes not participating in senior meal programs because they did not offer such foods). Because of the perceived healthfulness of Puerto Rican food, this led to worry about the effects of this poor diet on their health. As two Latinos said, "Sometimes even though there are means to get food, they are foods that we're not accustomed to. Sometimes we suffer a little." "If we don't have enough money to buy the foods to make the meals how we make them, we always feel somewhat out of control."

Severity, time and compromised choice. Common to the four components were the dimensions of severity, time and compromised choice. Each component ranged in severity as described above. A given elder could experience any or all components simultaneously, each at a different level of severity. Severity also depended on the frequency of the experience. The severity of food insecurity often varied across time. Many elders experienced a monthly financial cycle of availability and

then unavailability of money and thus food, with relative food security at the beginning of the month and food insecurity, in one or more components, at the end of each month. "In the beginning of the month I eat more meats, salads and fruits . . . At month's end I have to eat whatever is in the cupboard . . . Right now we aren't even in the second week of the month and I only have $49.00 in my account to finish off the month." "As we get paid once a month, many times our money finishes before the end of the month. We don't do too well the rest of the month because life is so expensive. Sometimes we have to do without . . ."

Food choice compromise was a central aspect of the experience of elderly food insecurity that related to each component. Compromises included trading-off certain types of foods for others, decreasing the number of meals in a day and choosing between food and medicine because they could not afford enough of both. Diet quality compromise was most common, but sometimes quality was preserved by instead compromising quantity (e.g., eating less but healthier more expensive items), or by eating in socially less acceptable ways. Food choice compromise in any of these three components often led to feelings of deprivation, worry and other aspects of the psychological component. The extent of these feelings depended in part on the elders' past experiences and resulting expectations. Actual hunger, corresponding to severe levels in all or most components, occurred once all compromises had been made in an elder's food situation.

Causes of food insecurity in elders. Although lack of money was a major cause of food insecurity for many participants, sometimes elders had enough money for food but were not able to access food, i.e., not able to get to the store because of transportation or functional limitations, or not able to use food, i.e., not able to prepare and/or eat food available in the household because of functional impairments or health problems. For example, one Latino man described his situation: "Twice I was left without eating. Once I stayed without eating because I had money but I had no one to take me to the store and I couldn't go. Another time I stayed without eating because I could not [prepare] it, because due to health I couldn't get up." A Caucasian woman said, "Like one of my health problems, you can't afford to buy the food, [another] of them is that you're unable to cook it." Another woman noted, "I was too sick to get up and prepare a meal. And I started losing a little bit of weight." A third woman moved in with her grandson's family after she had a stroke and could no longer prepare her meals, but continued to experience food insecurity. She had money for food, which she gave to the family, but the family was also food insecure so her money was used to buy food for the children and meals were seldom cooked for her. Still others had money for food but not enough additional money to pay the $15–20 to hire someone to take them shopping.

Some elders experienced food insecurity such as poorer diet or eating less than they should because of lack of motivation or energy to prepare meals, e.g., "Sometimes I don't feel up to cooking." This was often due to age-related issues such as being tired or lonely, or lack of appetite or interest in eating, sometimes due to depression. "It depends on how I'm feeling. If I'm hurting, if it's been a lot of rainy weather and things like that, then I'm not at my best. Then I don't cook." "Fixing and preparing my meals is difficult. I just don't have the appetite to eat like we used to eat . . . Probably if somebody else was fixing I would eat it."

Need for elderly-specific augmentation of the FSSM. Results from the qualitative study suggested that the national FSSM did not adequately capture the experience of elderly food insecurity in several ways, and 14 new items were developed to address these (**Table 2**). First, the importance to elders of having the "right foods for health" suggested that this should be part of the definition of food security and be directly assessed. Seven new items were developed addressing this issue. Second, while the lack of money is a major cause of food insecurity, two other immediate causes of food insecurity are also important for elders and should be included in measurement because they are policy-relevant, i.e., amenable to change through policy and of interest to policymakers. Based on participants' descriptions, we worded these as "because I couldn't get the food I needed even though I had money for food," and "because I was unable to prepare a meal even though I had food in the house." Both the new right foods for health items and the existing FSSM items were asked with each of these causes as well as with the original money cause. Finally, we included a few exploratory items with the cause "didn't feel up to cooking."

Performance of the elderly-augmented FSSM. The qualitative classification based on the in-depth interviews found 13 elders to be food secure and the other 35 to range from very mild to moderate-severe food insecure, a prevalence of 73%. Without augmentation, the FSSM also identified 13 of these 35 as food insecure (sensitivity 89%), and 9 of the 13 as food secure (specificity 69%).

For the original eight FSSM items, the difference in qualitatively derived food insecurity between an affirmative and negative response ranged from 0.01 to 1.91, whereas gamma ranged from 0.00 to 1.00. Of the new items, not being able to choose the right food and meals for health due to limited money (N2) and worrying about this (N5) performed well, as did two items based on the FSSM items (eating less and being hungry but didn't eat) but having the cause of limited access rather than money (N10 and N13). Items N3 and N6 (the same as N2 and N5 but due to limited access not money) were next strongest, followed by N8 (worried would not eat enough because could not prepare a meal). The other items with the "could not prepare" cause (N4, N7, N11, N14) did not perform well, perhaps because of the small numbers in the sample with that disability. Those with the exploratory cause "didn't feel up to cooking" (N9, N12) also did not perform well.

A direct comparison of C4 (not balanced meals) and N2 (not right foods for health) suggested the latter, with its higher gamma, to be more indicative of elderly food insecurity. Whereas 30 elders answered affirmatively to both, and all who answered affirmatively to N2 also answered affirmatively to C4, four answered negatively to C4 but affirmatively to N2 (i.e., these four elders reported they can afford balanced meals but not the right foods for health). Of these, two are identified by other FSSM items as food insecure, but two are not. Using N2 in addition to or instead of C4 increased the estimated prevalence of food insecurity by two. More importantly, using N2 in addition to or instead of C4 increased the sensitivity from 89% (FSSM alone) to 94%, whereas the specificity remained the same (69%). Adding the other best-performing items (N5, N10, N13) did not alter either sensitivity or specificity.

DISCUSSION

Our in-depth study provides a more complete conceptualization of the experience of elderly food insecurity than previously available. Based on an analysis of in-depth interviews with 53 low income urban elders, using principles of grounded theory, the experience of elderly food insecurity has four components: quantitative, qualitative, psychological and so-

TABLE 2

Elderly-augmented food security measure administered by telephone to 48 elders with prevalence of each newly developed and Food Security Survey Module item and comparison of items to the qualitative food insecurity classification

	Measurement item[1]	Prevalence	Compared to qualitative food insecurity classification	
			Difference in food insecurity, yes versus no[2]	Gamma, item versus food insecurity[3]
		%		
C2	"I worried whether my food would run out before I had money to buy more."	68.8	0.98	0.74
N1	"I worried whether my food would run out because I couldn't get the food I needed even though I had money for food."	45.8	0.40	0.32
C3	"The food that I bought just didn't last, and I didn't have money to get more."	62.5	1.24	0.74
C4	"I couldn't afford to eat balanced meals."	62.5	1.14	0.76
N2	"I couldn't choose the right food and meals for my health because I couldn't afford them."	70.8	1.21	0.87
N3	"I couldn't choose the right food and meals for my health because I couldn't get the food I needed even though I had money for food."	52.1	0.78	0.58
N4	"I couldn't choose the right food and meals for my health because I was unable to prepare a meal even though I had food in the house."	29.2	0.40	0.35
N5	"I worried that I would not eat the right food and meals for my health because I couldn't afford them."	60.4	1.09	0.80
N6	"I worried that I would not eat the right food and meals for my health because I couldn't get the food I needed even though I had money for food."	45.8	0.81	0.64
N7	"I worried that I would not eat the right food and meals for my health because I was unable to prepare a meal even though I had food in the house."	33.3	0.26	0.27
N8	"I worried that I would not eat enough because I was unable to prepare a meal even though I had food in the house."	22.9	0.57	0.46
N9	"I was not able to eat the right food and meals for my health because I didn't feel up to cooking."	52.1	0.28	0.32
C8	In the last 12 months, did you ever cut the size of your meals or skip meals because there wasn't enough money for food?	35.4	1.34	0.95
C9	In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food?	48.9	1.45	0.98
N10	In the last 12 months, did you ever eat less than you felt you should because you couldn't get the food you needed even though you had money for food?	26.1	1.13	0.80
N11	In the last 12 months, did you ever eat less than you felt you should because you were unable to prepare a meal even though you had food in the house?	21.7	0.37	0.28
N12	In the last 12 months, did you ever eat less than you felt you should because you didn't feel up to cooking?	38.3	0.01	0.00
C10	In the last 12 months, were you ever hungry but didn't eat because you couldn't afford enough food?	34.9	1.38	0.95
N13	In the last 12 months, were you ever hungry but didn't eat because you couldn't get the food you needed even though you had money for food?	25.5	1.03	0.76
N14	In the last 12 months, were you ever hungry but didn't eat because you were unable to prepare a meal even though you had food in the house?	19.6	0.28	0.21
C11	In the last 12 months, did you lose weight because you didn't have enough money for food?	8.0	1.91	1.00
C12	In the last 12 months, did you ever not eat for a whole day because there wasn't enough money for food?	22.2	1.24	0.86

[1] C indicates Food Security Survey Module items (with the item numbers corresponding to those used in reference 8) and N indicates newly developed items. Questions were answered yes or no. For statements respondents were asked, "Was that often true, sometimes true, or never true for you in the last 12 months?"

[2] Values are differences between mean food insecurity status based on in-depth interviews for those who answered yes versus no to each item.

[3] Values are differences in the number of concordant and discordant pairs divided by their total.

cial. Common to these components are the dimensions of severity, time and compromised food choice, the latter also found by Quandt et al. (13). The open-coded grounded theory approach that we used with the qualitative analysis provides strong confirmation of these components and dimensions that have been identified in previous research, while also providing the first full description of elders' food insecurity experience.

Our conceptualization of elderly food insecurity has both similarities and differences to that based on family research. Although the same four components emerged as in Radimer et al. (10), and are similar to the core characteristics identified by Hamelin et al. (29), the great importance within the qualitative component of having the right foods for health, and the anxiety elders experienced as a result of not having the right

foods for their health, are new elements specific to elders, which were not reported as major issues for younger people distinct from nutritional inadequacy. This greater concern probably relates to greater awareness among elders of the influence of diet on their health and their greater diet-related health problems. In addition, the distinction between less severe household and more severe individual levels of food insecurity (10,30) is not appropriate for elders, since most were living alone and children were seldom present. Unlike in Hamelin et al. (29), the lack of food safety did not emerge as a major concern. Although the monotony Hamelin et al. found was expressed, elders appeared very accepting of it.

Regarding ethnic and rural-urban differences, we found that the experience of food insecurity and the conceptualization that emerged were very similar among all groups studied, both in this and in our previous research in rural Caucasian and urban African-Americans (14). However, there were some differences in causes of and responses to food insecurity. Both urban Latino and rural Caucasian elders appeared less likely to use existing food programs and more resistant and embarrassed to ask for help from outsiders than urban Caucasian or African-American elders, instead relying on borrowing money from friends, buying food on credit from local grocers, relying on help from close friends or family who were not always able to provide the help needed or doing without. For Latinos, this may be because family is the traditional means of support and Latino elders are not accustomed to using social or government programs. In addition, many came from rural backgrounds and the rural pride that contributes to resistance to the use of government programs in rural elders may also be operating here (13,14). In Latino elders, the inability to speak English and the lack of culturally appropriate foods in senior meal programs and food pantries were additional barriers to the use of food programs.

Based on our findings, the generally accepted definition of food insecurity, "whenever the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways is limited or uncertain" (6), is not broad enough to include all aspects of food insecurity as experienced by the elderly. First, it does not adequately capture the importance to elders of having the right foods for health, which is only partly captured by the phrase "nutritionally adequate." Second, elderly food insecurity includes not only limited or uncertain access to food (ability to acquire), but also the inability to use food, i.e., to prepare, gain access to and/or eat food that is available in the household because of functional impairments and health problems. We propose instead the following adaptation of the alternate definition proposed by Radimer et al. (10): "the inability to acquire or consume an adequate quality or sufficient quantity of food appropriate for one's health in socially acceptable ways, or the uncertainty that one will be able to do so."

Regarding measurement, the FSSM is applicable to the experience of elderly food insecurity, but is missing certain key aspects. First, items measuring "right foods for health" need to be added. Since the majority of U.S. elders are experiencing one or more chronic health problems (31), and the relationship between diet and disease is well-known, having the right foods for health is a basic need. Limited or uncertain access to such foods constitutes food insecurity and should be part of its measurement.

Second, our study supported the findings of others that, although money is a major cause of food insecurity, other policy-relevant immediate causes of food insecurity also exist for elders (12,15,16). Specifically, two additional policy-relevant causes should be considered: "couldn't get the food I needed" and "unable to prepare." When the FSSM was developed, money was included as the only policy-relevant cause. Including "because there was not enough money for food" as part of each item was intended to distinguish true food insecurity from dieting, too busy to cook or other nonpolicy relevant causes. As Bickel et al. (8) noted, "Other possible sources of household food insecurity apart from financial constraint, such as reduced mobility or function for isolated elderly or ill persons, are not captured by the measure." However, with 16% of noninstitutionalized elders aged 65 y or older having one or more chronic disabilities and most having chronic health problems (31), food insecurity results from various conditions related to aging and is more than a poverty-linked and resource-constrained problem. Although there are some optional preliminary "general food sufficiency screener questions" to be used with the FSSM that include assessment of sometimes not having enough to eat because it is "too hard to get to the store" or because they are "not able to cook because of health problems," these are not included in the assessment of food insecurity.

Compared with the experience-based definitive criterion from our in-depth interviews, the FSSM had good sensitivity (89%), but moderate specificity (69%), results consistent with previous findings (27). Several of our augmented items performed quite well compared with the definitive criterion. In addition, the sensitivity of the measure for food insecurity increased with the addition of N2, while specificity did not change.

We recommend further testing of our newly developed items in a larger sample of food secure and insecure elders to select a small number of additional items to include as an addendum to the FSSM specifically for older people. We particularly recommend 10 of the 14 items for further testing based both on their performance in this limited sample and on our qualitative understanding of the issues. These are N2, N3, N4, N5, N6, N7, N8, N10, N11 and N13. We believe it likely that such testing will yield an augmented measure that will more accurately identify who needs food assistance programs, evaluate how well food assistance programs ameliorate lack of food and provide other information for elderly nutrition program planning and policy-making.

In addition, the item "couldn't afford right foods for health" (N2) should be seriously considered as a substitute for the "couldn't afford balanced meals" item, at least for elders. Others also have found problems with the "balanced meal" item (32,33,34). An alternate item "not being able to eat as one should" seemed marginally better when it was developed by Radimer et al. (10), but this item was not included in the FSSM because of potential problems with the interpretation of the item by respondents.

These results also have other implications for food assistance programs. For example, the importance to elders of having the right foods for health and the difficulty they have in reliably obtaining these foods suggests that elderly food assistance programs might develop better ways of helping to provide such foods. Better access to culturally appropriate foods and to emergency foods (e.g., without having to wait in long lines in the bitter cold) are also needed. Furthermore, given the importance of mental well-being for the maintenance of physical well-being in elders, help in the prevention of developing feelings of deprivation resulting from compromised choice seems warranted.

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