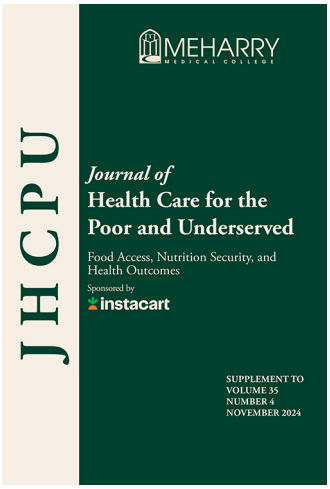
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Defining what Matters: Use of Q Methodology to Identify Food Values among People Living with HIV Affected by Food Insecurity

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Abstract: **Objectives/Background**. To inform the development of a "food is medicine" (FIM) intervention, the present study aimed to describe how people living with HIV (PLWH) prioritize daily food choices in the context of food insecurity. **Methods**. Interviews with PLWH experiencing various levels of food insecurity (n=24) were conducted using Q-Methodology. Participants ranked 57 food-choice value statements from "most like me" to "least like me" in a process called forced distribution. We then identified different viewpoints and shared perspectives through factor analysis. **Results**. Although food cost was a salient value, distinct viewpoints prioritized: 1) creative expression and sensory appeal; 2) disease management within physical limitations; 3) safety, familiarity, household practicality; 4) mainstream convenience; and 5) disease prevention and socioemotional coping. **Discussion**. Heterogeneous viewpoints on the relative importance of sensory appeal, functional capabilities, family food preferences, and other factors may affect whether and how future FIM participants use foods and related resources.

Key words: Q methods, food choice values, tailoring, food is medicine, food insecurity, HIV.

Although eating is a biological necessity for life, food choices are the reflection of multiple values that reflect human culture, constructed knowledge across the life course, and personal identity. Other important factors, such as available resources to acquire and prepare food, may place limits upon how individuals can express their

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values through food choices and thereby fully participate and self-actualize within human society. Ultimately, an individual's daily food selections result from a value negotiation that can occur both consciously and subconsciously,[1] and is dependent upon constraints and opportunities in the present moment.

A scoping review of studies conducted on determinants of food choice among resource-limited populations found that much of the research has focused on adolescents, women, and mothers[2] with considerable attention to values embedded within the constructs of food security,[3,4] including food familiarity or acceptability, availability, and affordability.[2] The main premise of food is medicine (FIM) programs is that by eliminating or reducing these physical and financial barriers to healthy foods through direct meal or grocery assistance, people will eat—and ultimately become—healthier.[5] Yet, more studies are needed for understanding how other food values are prioritized and negotiated among people affected by food insecurity and chronic disease, who are the primary audience for FIM programs.[5] Amidst national calls[6] and federal initiatives[7] to advance nutrition security, which emphasize the role of food in shaping individual and community capacity for disease prevention and management,[8] understanding motivations behind eating "for health" is paramount for the success of FIM and other nutrition-security initiatives.

Satter proposed that food choice values operate hierarchically, beginning with prioritization of foods that meet essential energy (survival) needs and are highly satiating, followed by prioritization of core foods that individuals personally view as socially acceptable and familiar.[9] Once these fundamental needs are met, additional values may come into play, such as food aesthetics, taste, and novelty (trying new foods). Finally, food may also become an instrumental expression of other values related to personal growth or changes in mindset, such as health or environmental stewardship. Operating from this framework, food must be reliably available and accessible before most people will be ready to take on new, healthy eating changes. However, health is rarely a sufficient motivator for behavior change, and other personal values can exert a more powerful and lasting effect.[10] For example, one study of food choice values found that preference for natural and environmentally sustainable foods was moderately correlated with fruit, vegetable, and sugar-sweetened beverage intake, while the value for weight control/health demonstrated only a weak correlation.[11] Thus, understanding personal food values beyond superficial values of taste, cost, and even health may provide FIM planners with the needed wisdom for designing programs that better align with food choice motivations of intended participants.

Nutrition has long been recognized as a cornerstone of medical care for optimizing the treatment outcomes, health, and longevity of people living with HIV (PLWH).[12] Medically-tailored meal programs originated at the peak of the HIV epidemic to help ameliorate social isolation and HIV-associated wasting, and have since served as a template for improving health outcomes for people with other acute or critical illnesses. Although major advances in HIV treatment have significantly improved life expectancy, PLWH spend nearly 10 more of their adult life years living with at least one additional chronic co-morbidity, such as chronic liver or kidney disease, compared with their HIV-negative counterparts.[13] People living with HIV also experience food insecurity at rates that are two to four times higher than the general U.S. population.[14,15] As the nutrition

needs for most PLWH have transitioned from acute to chronic, FIM programs serving this population must also further develop their approaches to include chronic disease self-management support. Medically-tailored groceries represent a potential opportunity for supporting nutrition security by reducing financial barriers to eating healthy foods, but as with all FIM programs, foods must be successfully incorporated into daily food choice routines and the program ideally should initiate long-term healthy eating changes.

To inform the development of a FIM home-delivered grocery program for PLWH, the aim of the present study is to describe how PLWH prioritize daily food choices in the context of food insecurity.

Methods

Study background. Conducted in Oklahoma, the Nutrition to Optimize, Understand, and Restore Insulin Sensitivity in HIV for Oklahoma (NOURISH-OK) study is a three-part, community-based participatory research project seeking to explore how food insecurity contributes to insulin resistance among PLWH. This study is led by several academic institutions in partnership with the state's largest AIDS service organization, Tulsa CARES, which served as the main recruitment site for the study. The first part of the study involved a cross-sectional survey, nutrition exam, and biomarker assessment among a community-based sample of PLWH to test a conceptual framework of food insecurity and insulin resistance.[16] The second part of the study aimed to qualitatively inform the design of a home-delivered FIM food box intervention for future implementation during the third part of the study. The data presented in this paper were collected during qualitative interviews conducted as part of the second study from a purposive sample of individuals who completed the first study, where demographics were collected and food security was assessed. A participant advisory committee made up of study-eligible individuals provided input regarding research questions, approach, and dissemination plans throughout all parts of the study. The NOURISH-OK study was approved by the University of Oklahoma Health Sciences Institutional Review Board (#12509).

Q methods overview. Conceptualized in 1935, Q methodology is a standardized, procedural technique for quantitatively describing different viewpoints or mindsets regarding socially complex or debated topics.[17,18] As a mixed methodology, this approach attempts to capture individual and group subjectivity where the researcher first creates a set of diverse opinion statements (Q-set) that are then rank-sorted by individual participants into a forced, quasi-normal distribution (Q-grid).[17] Although commonly used in political science, Q methodology is increasingly used to elicit perspectives on various health behavior-related topics.[18,19] Since this methodology was created exclusively to capture clusters of opinions, it is frequently used to define participant views and perspectives, recognize important internal and external stakeholders, classify pertinent criteria for certain groups of individuals, identify gaps in understanding, and elucidate areas of consensus or conflict in groups.[20] Q-methodology is beneficial for understanding diverse perspectives on food values and how people prioritize their food decisions because it seeks to measure subjectivity of a topic by creating clusters of like-minded individuals to create factors or "profiles" through analytical techniques.[20] For this study,

the research team selected Q methodology for its inductive and hypothesis-generating benefits since food choice values may influence whether people might consider participating in a FIM program, and once people are enrolled, the degree to which they might find the foods and corresponding nutrition curricula relevant to people like them.

Food choice value statements (Q-set). Seminal research on the determinants of food choice includes the Food Choice Process Model,[1] which conceptualizes food choices as the product of five complex factors (ideals, personal factors, resources, social framework, and food context) that change across the life course. Thus, we created a concourse, or collection of all potential statements, aimed to represent a wide variety of possible opinions about what matters most when making daily food choices to best capture differences of perspectives across participants.[20] We began with value statements (items) from the revised version of the Food Choice Value Questionnaire[11] that was initially developed by Steptoe, Pollard, and Wardle[21] and partly informed by the Food Choice Process Model.[1] These 25 items described values toward organic products, weight control, comfort, tradition, safety, sensory appeal, convenience, or access-related constructs.[11] These statements were reviewed by members of the participant advisory committee to help ensure they were relevant, meaningful, understandable, and able to evoke an opinion.[20] During the review process, the original food choice statement, "*Helps me control my weight,*" was modified into two separate statements to better capture potential differences in motivations for losing weight versus gaining weight. The original food choice statement "*How it smells*" was modified to "*How good it smells*" to help clarify positive experience of smelling food as opposed to foods that do not smell spoiled. The original food choice statement, "*Degree to which it reflects my cultural or ethnic traditions*" was modified to also include religious traditions. The original food choice statement "*Degree to which I can be sure it is not associated with food-borne illness*" was modified to include Salmonella as an example to ensure participant understanding.

The NOURISH-OK research team then developed 32 additional concourse statements with input from the study's participant advisory committee and other subject-matter experts. These items captured motivations for food choices not reflected in the revised Food Choice Value Questionnaire,[11] including food choices for general disease prevention and management, HIV wasting prevention, novelty/creativity, gastrointestinal symptom management, household food needs, basic needs, and pain/physical abilities.

Finally, a Q-grid was created to accommodate every statement in a quasi-normal distribution ranging from –5 (least in agreement) to +5 (most in agreement). The potential Q-set was then pilot-tested by three research assistants unfamiliar with the item development and further modified based on the results. The final Q-set comprised 57 statements that fell into 15 domains.

Participants. Purposeful sampling was imperative to elicit comprehensive results because the participants act as the variables within Q-methodology, not as a sample from a population.[20] In addition to food insecurity, we included characteristics of gender (self-identified male or female), household size (single vs. multiple) and area of residence based on the index of relative rurality (rural or urban)[22] to ensure heterogeneity within our sample. We compiled a list of participants from the first part of the NOURISH-OK study who had reported food insecurity in the past 12 months and who had agreed to be contacted about future research opportunities.[23] We then



Figure 1. Containers used for initial categorization of statements used during Q sort interview procedure.

divided that list based on history of low or very low food security status with further classification by gender, household size, and area of residence. The research team then invited eligible individuals to participate in the interviews until an equal representation of low (n=12) and very low food security (n=12) was achieved and while striving for an approximately balanced representation of gender, household composition, and area of residence within each of the two food-security groups. All participants provided written, informed consent to participate in the interviews.

Q sort interview procedures. Each statement from the Q-set was written on a laminated index card. The same interviewer conducted all interviews in person. After receiving an oral introduction to the purpose of the exercise, participants were asked to rank-order these 57 statements in response to the prompt, "When deciding what foods or meals to eat on a daily basis, how important are each of the following . . . ?" The interviewer asked participants to first categorize each statement into one of three containers marked, "Most like me," "Neutral," or "Least like me" (Figure 1). After that, the interviewer asked participants to further rank each statement using Likert categories ranging from least like me (–5 to –1) to most like me (+1 to +5) in a process called forced distribution.[23,24] Rankings started from the extremes of the sorting grid (–5, +5) and moved towards the center, alternating between the "Least like me" statement pile and the "Most like me" statement pile, not using the "Neutral" statement pile until one of the others ran out (Figure 2). Once the entire Q-grid was filled, participants had an opportunity to review their rankings and make changes.

Post-sort interview. Participants were then asked to explain reasons for placement of statements in the extreme values (–5 and +5) and whether there were any statements they would have ranked in the +5, "most like me" column that were missing from our Q-set.

Analysis. After interviews were completed, q-sorts were entered into a spreadsheet. Using the package method via R v4.2.1 (R Core Team, 2022), we first constructed a scree plot to determine the initial number of factors to include, which was confirmed using parallel analysis. Factor extraction was completed using principal components analysis with varimax rotation to produce factor results including within-factor item loadings

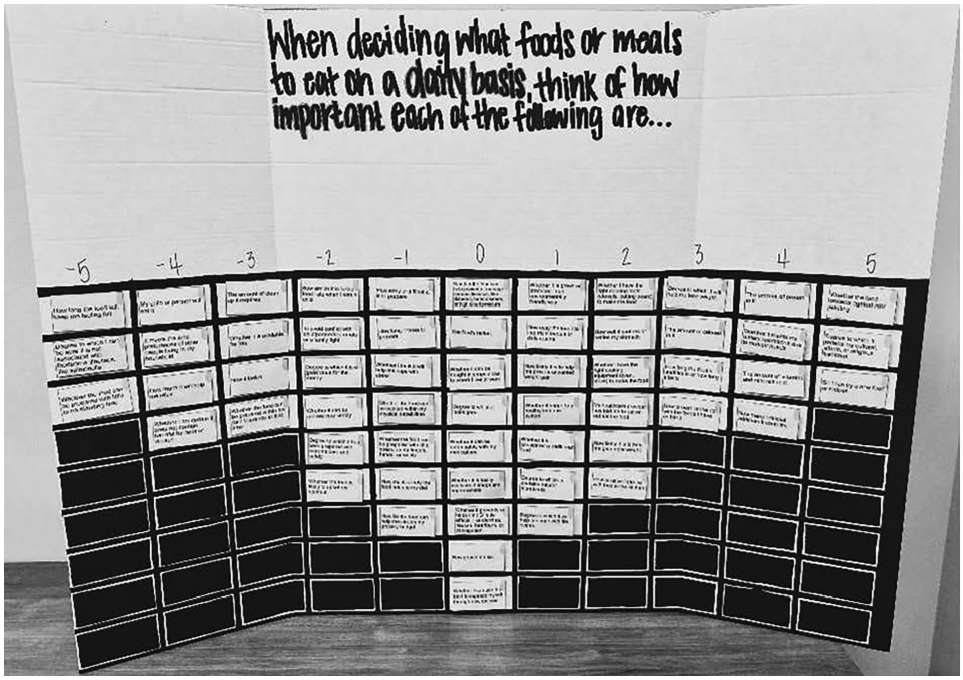


Figure 2. Example completed Q-grid used to accomplish forced distribution of statements during Q sort interview procedure.

and between-factor item agreement and divergence. Stevens suggests a minimum of loading of 0.3 regardless of sample size for the intention of construct interpretation,[25] while later studies have suggested more stringent minimums.[26,27] We have selected a factor loading of +/– 0.45 for the purposes of assigning q-sorts to factors and assessing demographic profiles. Two members of the research team reviewed transcripts from post-sort interviews among participants represented within each factor to help guide interpretation of each factor.

Results

Participant demographics. Participants were gender-balanced and racially-diverse with a mean age of 47 years (Table 1). Most participants lived in a multiple person household (58.3%) and reported either low food security (50%) or very low food security (50%), as measured by the United States Department of Agriculture (USDA) 10-item food security module.[4] The length of years living with HIV ranged from 0.6 to 34.6 years, with a mean of 14.3 years, and 20.8% reported a history of an AIDS diagnosis (Table 1).

Factor extraction outcomes. After importing the spreadsheet with q-sorts, a scree plot indicated five factors to be retained, which were also indicated via the parallel analysis. Among 24 q-sorts, 19 loaded on a single factor (>0.45), three loaded on two factors, and two did not converge on any factor. Q-sorts that did not converge were provided from individuals who were significantly younger and more recently diagnosed

Table 1.

PARTICIPANT DEMOGRAPHICS OVERALL AND BY FACTOR

	Overall (n=24)	Factor 1 (n=5)	Factor 2[a] (n=4)	Factor 3[a] (n=5)	Factor 4 (n=3)	Factor 5[a] (n=5)	Confounding (n=2)
Gender n (%)							
Male	13 (54.2)	3 (60)	1 (25)	2 (40)	2 (66.7)	4 (80)	1 (50.0)
Female	11 (45.8)	2 (40)	3 (75)	3 (60)	1 (33.3)	1 (20)	1 (50.0)
Age, years, M (SD)	47 (13.1)	55 (10)	48 (10.6)	47 (14)	48 (13.6)	46 (14.7)	29 (14.1)
Food security, n (%)							
Low	12 (50)	2 (40)	3 (75)	5 (100)	0 (0)	2 (40)	0 (0)
Very low	12 (50)	3 (60)	1 (25)	0 (0)	3 (100)	3 (60)	2 (100)
Race/ethnicity, n (%)							
American Indian or Alaska Native	3 (12.5)	1 (20)	0 (0)	0 (0)	1 (33.3)	1 (20)	0 (0)
Black or African American	6 (25)	1 (20)	0 (0)	1 (20)	1 (33.3)	1 (20)	2 (100)
Hispanic/Latino	3 (12.5)	1 (20)	1 (25)	0 (0)	0 (0)	1 (20)	0 (0)
White	12 (50)	2 (40)	3 (75)	4 (80)	1 (33.3)	2 (40)	0 (0)
Length living with HIV, years, M (SD)	14.3 (10.6)	17.2 (13.8)	17.2 (8.1)	12.9 (9.7)	18.6 (11.7)	13.6 (11.0)	.9 (.5)
Household size, n (%)							
Single	10 (41.7)	1 (20)	2 (50)	1 (20)	1 (33.3)	4 (80)	1 (50)
Multiple	14 (58.3)	4 (80)	2 (50)	4 (80)	2 (66.7)	1 (20)	1 (50)
Level of rurality[b]							
Urban (≤.4 IRR)	13 (54.2)	3 (60)	2 (50)	3 (60)	1 (33.3)	3 (60)	1 (50)
Rural (>.4 IRR)	11 (45.8)	2 (40)	2 (50)	2 (40)	2 (66.7)	2 (40)	1 (50)

Note:

[a]Includes 3 participants who loaded onto more than one factor. Participant demographics were reported in their highest loaded factor to avoid duplication.

[b]Designation based on the Index of Relative Rurality (IRR) that reflects four dimensions of rurality, including population, population density, extent of urbanized area and distance to the nearest metro area.[22]

with HIV (Table 1). From the five factors, distinguishing and consensus statements were analyzed (Table 2) and distinct viewpoints were extrapolated based on construct q-sorts regarding daily food decisions among the participants (Box 1).

Consensus among all factors. Among all factors, two value statements were similarly regarded. Each factor highly ranked the statement, "*How far the food can help me stretch my grocery budget*." Factor loadings for this statement ranged from 1.15–1.28 placing it at +3 for factors 1, 3, 4, and 5, and at +4 for factor 2, which suggests all participants displayed some degree of budget consciousness. Little concern was given to the statement, "*How long the food's shelf life is/how long it lasts*" with factor loadings ranking from 0.00 to 0.68, placing it from 0 on construct 4 and 5, and at 1 for constructs 1–3.

Individual factors. Five factors emerged that represented distinct points of view for what matters most when making daily food choices (Table 2). These viewpoints were described based on thematic priorities and our interpretation of the factors, including creative expression and sensory appeal (Factor 1); disease management within physical limitations (Factor 2); safety, familiarity, and household practicality (Factor 3); mainstream convenience (Factor 4); and disease prevention and socioemotional coping (Factor 5).

Factor 1. Creative expression and sensory appeal The first construct to emerge features those who prioritize creativity, sensory experiences, and interpersonal harmony in their food choices while showing less concern for health-related considerations. We termed this construct "*creative expression and sensory appeal*" based on highly prioritized statements regarding sensory attributes of food such as taste, smell, texture, and meeting the preferences of household members, demonstrating a strong inclination towards creating new and enjoyable culinary experiences for themselves and their loved ones. A key distinguishing statement here included, "How creative I can be with the food in the kitchen" (+5), with other supporting statements such as "Whether I can use the food to express myself through new recipes" (+2), "So I can try a new food or recipes" (+2), and "How much variety the food adds to my diet" (+4)—which all received scores higher than any other factor. In the words of one male participant with low food security as he explained his selection of ratings while also acknowledging his limited food resources, "I already have my menu built in my head . . . I wanna eat different things every day . . . sometimes that's all I have is what I have in my refrigerator, and I have to create something out of it." In the words of another male participant with very low food security, ". . . it ties in with the last place I lived—not now—I would get "Hello Fresh" . . . They were a lot of fun and you get to try new things without having to think about it and the food comes right to you, in the right portions, so no waste. It's wonderful. And express my artistic side that way."

This viewpoint also values practical aspects of food and eating, such as value for money, resourcefulness with available ingredients, and ease of cooking within physical capabilities, showcasing a pragmatic approach to food preparation, with "Whether the food can be cooked within my physical capabilities" (+3) being a distinguishing statement for this group. As explained by one female participant with very low food security, "I can only stand so long. My bones [are] detached on my left side and I'm left-handed." They rated statements related to safety with medications, dietary restrictions, and weight management as least like them, indicating a tendency to prioritize

Table 2.

ITEM LOADINGS FROM FACTOR ANALYSIS, PLACEMENT ON Q-SORT, AND DISTINGUISHING AND CONSENSUS STATEMENTS

		Q Factor Analysis										Item Analysis					
		Perspective 1		Perspective 2		Perspective 3		Perspective 4		Perspective 5		Overall		Ranked +5 "Most like me"		Ranked −5 "Least like me"	
Item No.	Statement	Load	Place	Load	Place	Load	Place	Load	Place	Load	Place	M	SD	n	%	n	%
1	Whether the food can help prevent or manage chronic diseases, like diabetes, heart disease, or high blood pressure[a]	−0.43	−1	0.82	2	0.28	1	−0.44	−1	2.23	5	1.04	2.74	3	12.5	0	0.0
2	My health care provider has told me to eat or not eat the food[a]	−0.69	−2	0.28	1	−1.44	−4	−0.22	0	0.68	2	−0.75	2.03	0	0.0	1	4.2
3	Whether it can be eaten safely with my medications[a]	−1.74	−5	1.15	3	1.08	3	0.73	2	−0.77	−2	0.50	2.70	0	0.0	1	4.2
4	Whether it meets my dietary restrictions due to medical needs[a]	−1.24	−4	1.57	5	−0.70	−2	0.27	1	1.31	4	0.08	2.98	1	4.2	2	8.3
5	Whether it is grown or produced in an environmentally friendly way[b]	−0.12	0	−0.30	−1	0.81	2	−1.69	−5	1.31	4	−0.13	2.51	0	0.0	2	8.3
6	Degree to which it contains natural ingredients[b]	0.68	2	0.89	2	0.01	0	−1.57	−5	0.83	2	0.63	2.57	2	8.3	0	0.0
7	How many artificial additives it contains[b]	−0.09	0	−0.74	−2	−1.21	−4	−1.36	−4	0.42	1	−0.71	2.73	1	4.2	1	4.2
8	The amount of vitamins and minerals in it[b]	0.81	2	−0.39	−1	−0.89	−2	−0.87	−2	−0.12	0	−0.33	2.57	0	0.0	1	4.2
9	Whether it supports a healthy immune system[a]	−0.90	−2	1.10	3	0.74	1	−0.18	0	1.99	5	0.96	2.84	3	12.5	1	4.2
10	Whether the food protects against HIV wasting[a]	−1.09	−3	0.41	1	−0.55	−1	−1.23	−4	−1.39	−5	−1.13	2.25	0	0.0	3	12.5
11	The amount of protein in it[a]	0.33	1	1.30	4	−1.09	−3	−1.57	−5	−1.07	−3	−0.08	3.05	3	12.5	0	0.0
12	How likely it is to help me gain more weight[a]	−0.55	−1	−1.84	−5	−1.45	−4	−0.14	0	−2.23	−5	−2.08	2.26	0	0.0	6	25.0

(*continued on p. 175*)

Table 2. (*continued*)

Item No.	Statement	Q Factor Analysis										Item Analysis					
		Perspective 1		Perspective 2		Perspective 3		Perspective 4		Perspective 4		Overall		Ranked +5 "Most like me"		Ranked +5 "Most like me"	
		Load	Place	Load	Place	Load	Place	Load	Place	Load	Place	M	SD	n	%	n	%
13	Degree to which it will help me lose weight[b]	−1.72	−5	−0.77	−2	−0.72	−2	−0.12	0	0.60	1	−1.88	2.09	0	0.0	2	8.3
14	The amount of calories in it[b]	−0.63	−1	−0.65	−2	−1.14	−3	−0.43	−1	−0.12	0	−1.42	2.30	0	0.0	2	8.3
15	How likely it is to help me prevent unwanted weight gain[b*]	−0.96	−2	0.97	2	−0.12	0	0.62	1	1.10	3	−0.75	2.40	0	0.0	1	4.2
16	How creative I can be with the food in the kitchen[a]	1.70	5	0.09	0	0.53	1	−0.34	−1	0.24	1	1.58	2.02	3	12.5	0	0.0
17	Whether I can use the food to express myself through new recipes[a]	0.95	2	−1.54	−4	−0.34	−1	−0.86	−2	0.24	1	0.17	2.28	1	4.2	1	4.2
18	So I can try a new food or recipes[a]	0.87	2	0.27	0	−0.06	0	−0.81	−2	0.24	1	0.50	2.23	1	4.2	0	0.0
19	How much variety the food adds to my diet[a]	1.36	4	−0.20	0	−1.09	−3	−0.12	0	0.65	1	0.17	2.75	1	4.2	1	4.2
20	How much it will help me relax[b]	−1.43	−4	−1.67	−4	−0.56	−1	1.01	2	1.13	3	−0.88	2.38	0	0.0	2	8.3
21	Whether I think it will help me cope with stress[b]	−1.30	−4	−0.79	−2	−1.19	−3	0.90	2	0.98	3	−1.46	2.48	1	4.2	2	8.3
22	Degree to which it will help me cope with life events[b]	−1.18	−3	−1.37	−4	−1.86	−5	−0.17	0	1.34	4	−1.00	2.78	1	4.2	1	4.2
23	Degree to which it reflects my cultural, ethnic, or religious traditions[b*]	−1.52	−5	−1.58	−4	−1.59	−5	−0.82	−2	0.77	2	−2.50	2.90	2	8.3	7	29.2
24	Whether it is considered a traditional food[b]	0.07	0	−0.51	−1	−1.72	−5	−1.23	−4	−0.80	−2	−1.38	2.26	0	0.0	3	12.5
25	How similar it is to the food I ate when I was a child[b]	−0.65	−1	−0.43	−1	1.15	3	0.16	1	−0.92	−3	−0.04	2.77	1	4.2	0	0.0
26	Whether it prevents or helps limit GI side effects, like diarrhea, nausea, heartburn, or constipation[a]	−1.24	−4	0.09	0	−0.28	0	0.80	2	0.68	2	−0.63	2.55	1	4.2	1	4.2
27	How well it soothes or settles my stomach[a]	−0.86	−2	0.73	1	0.57	1	0.18	1	−0.45	−1	0.04	2.40	1	4.2	0	0.0

(*continued on p. 176*)

Table 2. (*continued*)

Item No.	Statement	Q Factor Analysis										Item Analysis					
		Perspective 1		Perspective 2		Perspective 3		Perspective 4		Perspective 5		Overall		Ranked +5 "Most like me"		Ranked −5 "Least like me"	
		Load	Place	Load	Place	Load	Place	Load	Place	Load	Place	M	SD	n	%	n	%
28	Whether the food is likely to upset my stomach[a]	−1.12	−3	−1.07	−3	1.07	2	1.38	4	−0.27	−1	−0.54	2.77	1	4.2	2	8.3
29	Degree to which it has been prepared with extreme care and safety[b]	0.69	2	0.88	2	1.05	2	−0.34	−1	−0.50	−1	1.21	2.06	2	8.3	0	0.0
30	Degree to which I can be sure it is not associated with food-borne illness, like salmonella[b*]	−0.08	0	1.16	4	1.46	4	−0.84	−2	0.03	0	0.79	2.80	2	8.3	2	8.3
31	Whether I am certain it does not contain harmful bacteria or viruses[b]	−0.12	−1	0.69	1	1.76	5	−0.46	−1	0.89	2	0.88	2.68	2	8.3	1	4.2
32	Degree to which it looks good[b]	0.41	1	−1.94	−5	−0.16	0	0.44	1	−0.71	−2	−0.50	2.55	0	0.0	1	4.2
33	How it tastes[b]	2.30	5	0.09	0	1.25	3	1.79	5	0.65	1	2.67	2.16	6	25.0	0	0.0
34	How it good it smells[b*]	1.86	5	−0.46	−1	1.40	4	1.79	5	0.00	0	1.75	2.17	2	8.3	0	0.0
35	The food's texture[a]	1.33	4	−0.33	−1	0.78	2	1.31	4	0.21	0	1.00	2.64	1	4.2	2	8.3
36	How easy or difficult it is to prepare[b]	0.19	1	0.39	1	0.00	0	0.41	1	−0.86	−2	−0.04	1.76	0	0.0	0	0.0
37	Whether it can be cooked very simply[b]	0.05	0	−0.96	−2	−0.01	0	1.93	5	−1.34	−4	0.08	2.50	1	4.2	0	0.0
38	How long it takes to prepare[b]	0.13	0	−0.17	0	−0.69	−1	1.11	3	−0.24	0	−0.38	2.16	0	0.0	1	4.2
39	How easy the food fits into my schedule or daily routine[a]	−0.20	−1	0.01	0	0.39	1	1.56	4	−1.10	−4	0.17	2.20	1	4.2	0	0.0
40	The amount of clean-up required[a]	−1.01	−2	−0.21	−1	−1.27	−4	0.72	2	−0.42	−1	−1.25	2.54	1	4.2	3	12.5
41	It meets the food preferences of other people living in my household[a]	1.30	3	−1.09	−3	1.83	5	−1.43	−4	−0.65	−1	−0.13	3.08	3	12.5	2	8.3
42	My child/partner will eat it[a]	1.20	3	−1.17	−3	1.38	4	−1.22	−3	0.62	1	−0.25	3.23	3	12.5	3	12.5
43	To avoid conflict with child/partner/ roommate or a family fight[a]	−1.18	−3	−1.84	−5	0.44	1	−1.08	−3	−0.21	0	−1.71	2.74	0	0.0	4	16.7
44	Whether it can be bought in shops close to where I live or work[b]	0.20	1	0.99	2	−0.76	−2	1.70	4	−1.10	−4	0.13	2.23	1	4.2	1	4.2
45	Whether it is easily available in shops and supermarkets[b]	−0.02	0	0.40	1	−0.05	0	−0.27	−1	−0.89	−2	0.00	1.72	0	0.0	1	4.2

(*continued on p. 177*)

Table 2. (*continued*)

Item No.	Statement	Q Factor Analysis										Item Analysis					
		Perspective 1		Perspective 2		Perspective 3		Perspective 4		Perspective 5		Overall		Ranked +5 "Most like me"		Ranked −5 "Least like me"	
		Load	Place	Load	Place	Load	Place	Load	Place	Load	Place	M	SD	n	%	n	%
46	Degree to which it is a good value for the money[b]	1.39	4	1.65	5	0.81	2	−0.19	0	1.99	5	2.42	1.91	4	16.7	0	0.0
47	How far the food can help me stretch my grocery budget[a]	1.26	3	1.28	4	1.15	3	1.22	3	1.16	3	2.83	1.37	4	16.7	0	0.0
48	Whether I have the right cooking tools (knife, cutting board) to make the food[a]	−0.12	0	−0.11	0	0.87	2	−0.96	−3	−0.95	−3	−0.58	2.84	0	0.0	4	16.7
49	Whether I have the right cooking equipment to make the food (oven, stove)[a]	0.15	1	1.17	4	1.41	4	−0.87	−2	−1.37	−4	0.75	2.15	0	0.0	0	0.0
50	Whether it is available for free[a]	0.69	2	−0.87	−2	−0.29	−1	1.08	3	−0.89	−2	−0.21	2.38	2	8.3	0	0.0
51	How to best "make do" with the foods I have on hand[a]	1.47	4	1.06	3	1.50	5	1.06	2	0.00	0	2.25	2.29	4	16.7	0	0.0
52	How long the food will keep me feeling full[a]	−0.11	0	0.21	0	−0.04	0	1.14	3	1.16	3	0.58	2.52	0	0.0	1	4.2
53	How long the food's shelf life is/how long it lasts[a]	0.61	1	0.68	1	0.37	1	0.06	0	0.00	0	0.92	2.57	2	8.3	1	4.2
54	Whether the food can be prepared with little to no standing time[a]	0.21	1	1.06	3	−0.79	−2	0.50	1	−1.99	−5	−0.25	2.71	2	8.3	1	4.2
55	Whether the food can be prepared with little stress on my fingers, hands, or wrists[a]	−0.27	−1	0.75	2	−0.67	−1	−0.61	−1	−0.33	−1	−0.67	2.55	0	0.0	0	0.0
56	Whether the food can be cooked within my physical capabilities[a]	1.07	3	1.84	5	−1.03	−2	0.01	0	−0.68	−1	0.75	2.97	2	8.3	0	0.0
57	Whether the food can be prepared within my pain tolerance at that time[a]	−0.70	−2	−0.98	−3	−0.34	−1	−1.41	−4	−1.07	−3	−1.21	2.30	0	0.0	1	4.2

Notes:
[a] Developed by NOURISH-OK Team with input from Participant Advisory Committee
[b] Food Choice Value Questionnaire Item; *denotes item modified from original question
Factor Loadings included in grayscale gradient are significant (P<.05), distinguishing statements for each column—with darker cells representing more extreme valuations of either least or most liked. Factor loadings with * are consensus (Statements 47 and 53).

Box 1.

CONSTRUCT SUMMARY DESCRIBING FOOD CHOICE CONSIDERATION PROFILES AMONG PEOPLE LIVING WITH HIV (PLWH) AFFECTED BY FOOD INSECURITY

Construct name	Summary
Creative expression and sensory appeal (Factor 1)	Seeks variety and creativity with daily food choices, also prioritizes decisions based on taste, smell, and texture of foods while striving to "make do" with foods available on hand, physical capabilities, and household food preferences; food choices are not influenced by medication or disease-related factors.
Disease management within physical limitations (Factor 2)	Prioritizes food choices based on medical- and prescription-related dietary restrictions; prepares meals based on available cooking equipment and physical abilities such as standing time; selects food items based on food safety, protein content, immune support characteristics; food appearance and household preferences are unimportant with neutral interest in sensory, creativity, or food variety.
Safety, familiarity, household practicality (Factor 3)	Although considers medication-related restrictions, food choices otherwise are not driven by nutritional properties of the food, such as vitamins, calories, or protein content, or dietary diversity. Prioritizes food safety, childhood foods, food taste, smell, and texture. "Makes do" with foods on hand with strong deference to household food preferences in the context of having the right tools and cooking equipment with neutral attitudes toward convenience foods.
Mainstream convenience (Factor 4)	Greatly prioritizes food convenience, sensory appeal, and satiation with negligible consideration for food safety or health-related factors other than avoiding stomach upset. Environmental sustainability and household food preferences do not influence daily food decisions.
Disease prevention and socioemotional coping (Factor 5)	Chooses foods that are natural, helpful in preventing unwanted weight gain, and that will prevent chronic diseases. Also seeks out foods based on their ability to provide relaxation and comfort. Less motivated by food safety, sensory appeal, and new cooking experiences. Need for convenience or modifications based on physical abilities do not influence daily food decisions.

sensory enjoyment and social dynamics over chronic disease self-management concerns. This is supported by the factors with low ratings and negative distinguishing statements, including "Whether it can be eaten safely with my medications" (–5), "Degree to which it will help me lose weight" (–5), and "Whether it prevents or helps limit GI side effects, like diarrhea, nausea, heartburn, or constipation" (–4). As explained by one

male participant with low food security, "Because my doctor really doesn't talk about my diet . . . I don't have no [dietary] restrictions."

Participants in factor 1 (n=5) included men and women with low and very low food security, with all but one living in multiple-person households. They were racially diverse with two participants self-identifying as White and the remaining three self-identifying as either American Indian/Alaskan Native, Black/African American, or Hispanic/Latino. Compared with participants from other factors, participants in factor 1 had the highest mean age of 55 years. The mean length of living with HIV was 17.2 years.

Factor 2. Disease management within physical limitations. We describe the second construct that emerged as "disease management within physical limitations," which prioritizes health considerations within the constraints of the person's physical capabilities while showing little concern for social dynamics or sensory experiences. In the words of a female participant with very low food security, "[HIV] attacks the weakest link in your body, and then it progresses that faster so I didn't know I had MS (multiple sclerosis) [until after my HIV diagnosis]. So, the HIV took my neurological issue and just woosh! with it. So, for me [my health's] important. I have to make sure that I am completely healthy in every area so that I don't regress."

Statements related to weight gain, weight loss, calorie content, creativity, and emotional expression through food had the lowest ratings among this group, indicating a strong emphasis on health and practicality over external factors. In the words of another female participant with low food security, "We get $214 in food stamps and that's it. So I've got to make do with what I have . . . I really don't get into, like, new recipes. I stick with what I know. And then I cook." This construct highly prioritized statements regarding physical capability to prepare food, safety with medications, dietary restrictions, protein content, food safety, and value for money, demonstrating a meticulous approach to ensuring the healthfulness, safety, and affordability of their food choices. They also valued practical characteristics such as equipment availability, resourcefulness with available ingredients, and minimal standing time, showcasing a pragmatic approach to food preparation. Positive distinguishing statements for this construct were "Whether the food protects against HIV wasting" (+1), "The amount of protein in it" (+4), "Whether the food can be prepared with little stress on my fingers, hands, or wrists" (+2), and "Whether the food can be cooked within my physical capabilities" (+5) with the only negative distinguishing statement being "Degree to which it looks good" (–5).

Participants in factor 2 (n=4) were primarily female and White and reported low food security with an even split between those living in a single-person household and those living in a multiple-person household. Participants in this group had a mean age of 48 years and had been living with HIV for an average of 17.2 years.

Factor 3. Safety, familiarity, and household practicality. The next construct we call "safety, familiarity, and household practicality;" it reflects prioritization of both food safety and sensory enjoyment in food choices while showing less concern for external influences or cultural traditions. Statements related to health care provider recommendations, dietary restrictions, artificial additives, and weight-related concerns had the lowest ratings among this group, indicating a tendency to prioritize personal

and household preferences over external directives. The lowest-rated distinguishing statements included, "My healthcare provider has told me to eat or not eat the food" (–4), "How much variety the food adds to my diet" (–3), and "Whether the food can be prepared with little to no standing time" (–2).

This group demonstrates a strong inclination towards familiar foods and ensuring the safety and enjoyment of their culinary experiences, while considering practical concerns of cooking including household agreement, availability of ingredients, and budget-consciousness—with positive distinguishing statements being "How similar it is to the food I ate when I was a child" (+3), "Whether I am certain it does not contain harmful bacteria or viruses" (+5), and "Whether I have the right cooking tools (knife, cutting board) to make the food" (+2). While explaining values related to food safety, post-interview statements from two participants included one male who said, "I'm already dealing with, ya know, an immune deficiency" and one female who said, "I don't want to eat anything expired." Several participants described the influence of household members on mealtime behaviors; one female said, "It really matters to me [whether] other people that are there will eat it or not . . . I don't wanna make it if no one wants it." Separately a male participant said, "It's just a lot easier, your partner is eating whatever you're eating . . . and he's better about it than I am . . . he'll fix stuff that I like, [but] he's a lot more adventurous than I am . . . I'm meat and potatoes and he likes . . . vegetables and stuff like that."

Participants in factor 3 (n=5) were mostly White and female, and all but one lived in multiple-person households. Interestingly, all had low food security. The mean age for this factor was 47 years and it had the lowest mean of years living with HIV at 12.9 years.

Factor 4. Mainstream convenience. The overall theme of this construct formed the perspective of "*mainstream convenience*," which highly prioritized statements regarding ease of cooking, time efficiency, budget stretching, satiation, sensory appeal, and accessibility, demonstrating a strong inclination towards simplicity and convenience in their food choices. Positive distinguishing statements that highlight these sentiments are "Whether it can be cooked very simply" (+5), "How long it takes to prepare" (+ 3), "How easy the food fits into my schedule or daily routine" (+4), and "The amount of clean-up required" (+2) along with other highly-rated statements about food accessibility, including "Whether it can be bought in shops close to where I live or work" (+4) and "How far the food can help me stretch my grocery budget" (+3).

This construct showed less concern for environmental impact or culinary expression—ranking statements related to environmental sustainability, natural ingredients, HIV wasting prevention, and culinary creativity as least like them. Examples of negatively-endorsed distinguishing statements include "Whether it is grown or produced in an environmentally friendly way" (–5) and "Degree to which it contains natural ingredients" (–5). Although health-related statements received lower endorsements, one male participant acknowledged the tradeoffs between meeting basic needs and eating for health, "But since I have heart disease and have stroked before, I really watch everything I do when it comes to food . . . when I . . . eat or drink, that's always in the back of my head . . . And then the value of it, I try to eat as healthy as possible as based on the value of what I can afford at the time and what I can't, you know? . . . I try to make sure the first thing I do is keep lights on and then food."

This factor was endorsed by the smallest number of participants (n=3) including two men and one woman who all had very low food security and primarily lived in rural communities and multiple-person households. These individuals each self-identified as either American Indian/Alaskan Native, Black/African American, or White. Participant mean age was 48 years and these participants had the longest average length of living with HIV at 18.6 years.

Factor 5. Disease prevention and socioemotional coping. The construct "*disease prevention*" highly prioritized chronic disease prevention and management as well as immune support. This is highlighted by distinguishing statements of "Whether the food can help prevent or manage chronic diseases, like diabetes, heart disease, or high blood pressure" (+5), "Whether it supports a healthy immune system" (+5), and "Degree to which it will help me cope with life events" (+4). Although the statements did not meet the statistical threshold to be distinguishing statements, food choices related to the need for relaxation and coping with stressors were salient. Although like Factor 2 "*disease management within physical limitations*" in how they regarded health-related food values, this viewpoint did not display considerations for physical capabilities regarding food preparation as illustrated by the negatively-endorsed distinguishing statement, "Whether the food can be prepared with little to no standing time" (–5).

Participants in factor 5 (n=5) were primarily male (n=4), had very low food security (n=3), and lived in single-person households (n=4). They were racially diverse with two participants self-identifying as White and one person each who self-identified as American Indian/Alaskan Native, Black/African American, and Hispanic/Latino. Participants in factor 5 had the youngest mean age of 46 years and had a mean length of living with HIV of 13.6 years.

Discussion

This study aimed to deepen our understanding of how PLWH affected by food insecurity go about making daily food-choice decisions, including considerations that are most important to them beyond well-described factors such as food cost and availability. We believe this study's findings help to fill an important gap in the literature by illustrating the diversity of perspectives that can exist within a defined study sample, despite all participants sharing the experience of a limited food budget and working to manage the same type of chronic disease (HIV). For individuals and organizations who are working to develop "food is medicine" (FIM) and other nutrition equity programs for people with HIV and other chronic diseases, we discuss three important takeaways for ensuring program relevance in the context of food insecurity.

First, household food preferences were rated highly in two of the five factors (Factors 1 and 3), and not surprisingly, nearly all the participants represented in these factors had multiple people living in the home. Additionally, within these two factors, statements about eating for personal health were mostly endorsed neutrally or ranked as low priority, which suggests PLWH who hold viewpoints represented by these two factors may be particularly responsive to family-centered FIM programs. When working to change behaviors that occur within the home (e.g., meal preparation and eating), FIM program planners should consider the influence of family as an "unparalleled player"

for developing, maintaining, and changing behaviors.[27] Evaluations from FIM programs increasingly recognize that services should be dosed at the household-level since foods are usually shared among the family.[5] Family-centered culinary medicine classes may be particularly appealing for those sharing Factor 1 viewpoints, which also prioritized sensory and creativity-related aspects of food and eating. Findings from this study suggest increasing the reach of FIM programs may be contingent upon meeting the call for family-centered FIM programming, especially for grocery and produce prescription programs, which require prescribed foods be prepared and integrated into meals.[5]

Second, health was a motivating value within two of the five factors (Factors 2 and 5). Multiple Q-set opinion statements, derived from community input through the study's advisory committee of PLWH, ultimately helped to distinguish these factors, such as choosing foods that support a healthy immune system (Factor 5) and nutritional properties of the food, such as protein content and ability to protect against HIV wasting (Factor 2). Although not a distinguishing statement, choosing foods within medical restrictions was also positively endorsed within these perspectives. However, deeper exploration of other values defining these viewpoints reveal important nuances in how food choices may ultimately play out despite these health-related values, particularly the apparently low (Factor 2) versus high (Factor 5) physical capabilities in preparing food that helped to distinguish these two factors. Interestingly, neither of these factors strongly endorsed sensory or other aspects of the eating experience or creativity through cooking. These competing perspectives present a potential challenge for the effective messaging and reach of traditional culinary medicine-type programs that usually prioritize sensory and artistic aspects of cooking.[28] Practical, no-frills education for which foods best meet health needs, within physical, medication and/or diagnosis-related restrictions, including easy-to-prepare options, may be more appropriate for reaching these segments.

Finally, the stereotypical preference of choosing foods that are "fast, cheap, and easy" with little prioritization of other values manifested in only one factor (Factor 4) that comprised only three individuals who were all affected by very low food security. However, post-Q-sort interviews suggested that financial constraints may be suppressing their ability to prioritize and make food decisions based on other values they view as important, including health. This finding provides an important reminder that individual expression of food values may be limited by external factors, such as limited resources. One novel evaluation question for future FIM studies could be whether food choice values change during program participation and whether changes are associated with improvements in food security and/or healthy eating.

This study has several strengths and limitations. A major strength is the participatory process used to create the Q-sort statements that helped to ensure a diversity of opinion statements were available during the Q-sort procedure. Derived through an inductive methodology, the results from this study can be used by FIM program planners and evaluators to better understand the main viewpoints among PLWH about what matters most when making daily food choice decisions. However, an important limitation of this study is that only PLWH experiencing low or very low food security were represented and one of the health-related statements that distinguished one of the factors

was HIV-specific. Additionally, one of the distinguishing statements for another factor was related to food safety with several post-sort interviews describing their concerns about their immunocompromised status. To explore whether other viewpoints exist, future studies could further expand upon this research by including people with marginal food security or who are living with other chronic health conditions frequently encountered by FIM programs, such as diabetes, cancer, or renal failure. We encourage researchers to solicit feedback from patient populations other than PLWH while finalizing Q-set statements to ensure health-related statements are relevant.

In conclusion, heterogeneous viewpoints on the relative importance of sensory appeal, functional capabilities, family food preferences, and other factors may affect whether and how FIM participants use foods and related curricula. Reasons behind personal food choices are likely influenced by complex cognitive, functional, social, and structural factors that may ultimately determine dietary intake. Thus, if we are to be effective in addressing nutrition inequities within patient and community populations, including PLWH, we must be willing to dig deep into these determinants, beginning with personal food values. Since HIV is now viewed as a chronic disease[29] that shares many similarities with other chronic conditions requiring lifelong medication management and consideration of food/drug interactions or side-effects, such as heart disease, diabetes, and various autoimmune conditions, we also argue that findings from our study warrant consideration by those working with a variety of other nutrition-related chronic conditions. We encourage nutrition program planners to conduct formative research within their priority population(s) to better understand intended audience priorities, needs, and food choice values to help ensure programs will be relevant, well-received, and effective. Future studies should investigate how these values may affect engagement and impact of FIM programming, and whether improvements in food security may influence the evolution or expression of food choice values over time.

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