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Food Insecurity Is Associated with Key Functional Limitations and Depressive Symptoms in Older People Living with HIV

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To the Editor:

FOOD INSECURITY AFFECTS more than one billion people worldwide.¹ Rates of food insecurity may be higher among people living with HIV (PLWH) than the general population. In the United States, 25–80% of PLWH may be food insecure, compared with 14% of the general population.² While anti-retroviral therapy has led to longer life expectancies and improved quality of life among PLWH,³ some face economic hardship, which may predispose them to food insecurity.

Older PLWH in particular are at risk for food insecurity and its associated conditions,⁴ including poor nutrient intake,⁵ poor medication adherence,⁶ and frailty, a clinically recognized state of increased vulnerability to everyday and acute stressors.⁷ Hence, we sought to describe the prevalence of food insecurity among a diverse population of older PLWH engaged with care in an outpatient clinical setting. We hypothesized that food insecurity would be associated with greater depression, functional limitations, and frailty.

In this cross-sectional study, older adults with HIV (age 50 or older) were randomly selected from an urban academic outpatient HIV clinic. Participants completed a self-administered questionnaire on demographics, health status, and psychosocial factors in English or Spanish.⁸ Participants aged 55 or older were invited to participate in a substudy that assessed frailty, and in total, 164 (53.9%) of 304 participants who completed the questionnaire and were age 55+ agreed to participate.⁹ Study participants provided written informed consent. This study was approved by the Weill Cornell Medicine Institutional Review Board.

Food insecurity was assessed using the United States Department of Agriculture (USDA) six-item short form food

security module. This scale includes questions that capture uncertainty about food supply, financial limitations, and challenges in accessing food.¹⁰ The module characterizes scores into three categories: high/marginal, low, and very low food security. Respondents in the latter two categories were considered food insecure.

Participants were asked how they managed on their income every month. Those who responded “I do not have enough to cover my living expenses” or “I just manage to get by” were considered financially insecure. Participants also answered questions regarding meal or nutrition assistance programs, which were categorized as any versus no service use.

The 10-item Center for Epidemiological Studies-Depression Scale (CES-D-10) was used to screen for depression, and scores ≥ 10 indicated significant depressive symptoms.¹¹ Basic and instrumental activities of daily living (ADL) were assessed; those who reported “a little difficulty,” “a great deal of difficulty,” or a complete inability to perform the task were considered to have difficulty completing that specific ADL. Criteria from Fried et al were used to assess the frailty phenotype and compute a frailty score,¹² dichotomized as nonfrail (meeting 0 criteria) or prefrail/frail (meeting one or more frailty criteria).

Statistical analysis was conducted using Stata/IC version 17.0 (StataCorp LLC, College Station, TX). Comparisons of dichotomous variables between food-secure versus food-insecure participants were assessed using chi square tests, and continuous variables by *t*-tests or Wilcoxon rank-sum tests. For the outcomes of depression, functional limitations, and frailty, backward stepwise logistic regression was used to adjust for potential confounding variables (age, sex, financial

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TABLE 1. DEMOGRAPHIC AND CLINICAL CHARACTERISTICS OF STUDY PARTICIPANTS

| Characteristic | Food secure (n=104) | Food insecure (n=58) | p |
|---|---------------------|----------------------|-------|
| Age, mean (SD) | 61.3 (6.0) | 60.7 (5.3) | 0.51 |
| Male sex | 66 (63.5%) | 41 (70.7%) | 0.35 |
| Race ^a | | | |
| Black | 53 (52.5%) | 28 (50.0%) | 0.92 |
| White | 27 (26.7%) | 19 (33.9%) | |
| Other | 21 (20.8%) | 9 (16.1%) | |
| Use of a meal or nutrition program | 9 (8.7%) | 9 (15.5%) | 0.18 |
| Low financial security ^b | 59 (56.7%) | 50 (86.2%) | <0.01 |
| Education less than high school degree | 30 (28.9%) | 18 (31.0%) | 0.77 |
| Years with HIV, mean (SD) | 24.5 (5.9) | 25.1 (5.1) | 0.51 |
| Nadir CD4 count per mm ³ median, (Q1, Q3) ^c | 123 (41, 249) | 118 (45, 210) | 0.53 |

^aData were missing for race [n=5 (3 in food secure and 2 in food insecure)].

^bData were missing for financial insecurity (n=6 [4 in food secure and 2 in food insecure]).

^cData were missing for nadir CD4 count [n=6 (6 in food secure)] SD, standard deviation.

security, education attainment), with a significance level of <0.10 set as the prespecified criterion for inclusion in models. Analyses were not adjusted for multiple comparisons.

The study population consisted of 162 participants, 156 of whom completed frailty testing. The mean age of

study participants was 61 years (standard deviation=5.7); 66% identified as male, 53% Black, and 70% financially insecure.

Fifty-eight (35.8%) participants experienced food insecurity in the 12 months before the study (Cronbach's alpha=0.86, indicating acceptable internal consistency). Financial insecurity was more common in the food-insecure group (n=50/58, 86%) versus the food-secure group (n=59/104, 57%). Use of meal or nutrition programs did not differ significantly between the food insecure group (n=9/58, 16%) and the food secure group (n=9/104, 9%). Table 1 summarizes the demographic and clinical characteristics of participants by food security status.

Overall, 80 (50.0%) participants reported clinically significant levels of depressive symptoms (Cronbach's alpha=0.83). In a backward stepwise logistic regression model with depression as the outcome, only food insecurity met the criteria to remain in the model (Table 2).

Food insecurity was significantly associated with difficulties in shopping, handling money, and walking across a small room; age, sex, financial insecurity, and low education did not meet the criteria to remain in these models. Food insecurity was associated with difficulty performing housework after adjustment for age, although this did not reach statistical significance. There was also a trend for an association between food insecurity and difficulty feeding oneself. There was no significant relationship between food insecurity and difficulty preparing food (Table 2).

Overall, 104 (66.7%) participants were either prefrail (n=86, 55.1%) or frail (n=18, 11.5%). Food insecurity was associated with the prefrail/frail state in a univariable logistic regression model; however, this association was slightly weakened in a backward stepwise logistic regression model adjusted for age, education, and financial insecurity.

TABLE 2. ASSOCIATIONS BETWEEN FOOD INSECURITY AND DEPRESSION, FUNCTIONAL DEFICITS, AND FRAILITY

| Outcome | Food secure | Food insecure | Univariable logistic regression model | | | Multi-variable logistic regression model | | |
|---|-------------|---------------|---------------------------------------|-----------|-------|--|-----------|-------|
| | | | OR | 95% CI | p | OR | 95% CI | p |
| Depression ^a | 46 (44.7%) | 34 (59.7%) | 1.83 | 0.95–3.53 | 0.07 | 2.11* | 1.07–4.16 | 0.03 |
| Difficulty shopping ^b | 19 (18.2%) | 21 (36.8%) | 2.61 | 1.25–5.43 | 0.01 | 2.73 | 1.29–5.75 | <0.01 |
| Difficulty preparing food ^b | 21 (20.2%) | 18 (31.6%) | 1.82 | 0.87–3.81 | 0.11 | | | |
| Difficulty performing housework ^c | 32 (30.8%) | 25 (43.9%) | 1.76 | 0.90–3.43 | 0.10 | 2.11* | 0.96–4.61 | 0.06 |
| Difficulty handling money ^b | 4 (3.9%) | 9 (15.8%) | 4.69 | 1.37–16.0 | 0.01 | 4.59 | 1.35–15.7 | 0.02 |
| Difficulty feeding self ^d | 2 (1.9%) | 5 (8.8%) | 4.86 | 0.91–25.9 | 0.06 | 4.75 | 0.90–25.3 | 0.07 |
| Difficulty walking across a small room ^e | 6 (5.8%) | 9 (16.0%) | 3.10 | 1.04–9.21 | 0.04 | 3.03 | 1.02–9.04 | 0.046 |
| Prefrail/frail ^f | 59 (59.0%) | 45 (80.4%) | 2.84 | 1.31–6.14 | <0.01 | 2.35** | 0.97–5.71 | 0.06 |

Backward stepwise logistic regression models included food insecurity, age, sex, financial security, and educational status as potential covariates. For the outcomes of difficulty shopping, difficulty handling money, difficulty feeding self, and difficulty walking across a small room, no covariates other than food insecurity remained in the model. For the outcome of difficulty preparing food, no potential predictors met the criteria to remain in the model.

^an=160.

^bn=161.

^cn=163.

^dn=162.

^en=159.

^fn=156.

*Adjusted for age.

**Adjusted for age, education, and financial security.

CI, confidence interval; OR, odds ratio.

In this study of older PLWH, more than one-third of participants experienced food insecurity in the preceding 12 months. Food insecurity was significantly associated with depression and with key functional limitations in shopping, walking across a small room, and handling money. Food insecurity was associated with frailty state in a univariable logistic regression model, although this association was attenuated by adjusting for age, education, and financial insecurity, supporting the complex and multi-factorial nature of frailty.

These findings corroborate past investigation of food insecurity experienced by older PLWH. A cross-sectional analysis of older PLWH in San Francisco reported a similar prevalence of food insecurity (32%) and observed connections between food insecurity, depression, and dependence in ADLs.⁴

Our study has several strengths including the diverse study population, representation of women, and use of well-characterized clinical and psychosocial outcome measures. However, there are several limitations. Participants were recruited from one academic medical center and those who agreed to participate may have been more health conscious. Although we attempted to reduce selection bias by randomly selecting participants from the patient population, our survey sample may have missed individuals who are less engaged in care and/or unwilling to disclose aging- and food-related issues.

Another limitation is the cross-sectional design, which precludes inferences about causal relationships between food insecurity and depression and physical outcomes. The association between frailty/prefrailty and food insecurity could go in either direction, with poor nutrition leading to frailty, or frailty limiting stable access to food. We might hypothesize that functional deficits such as difficulty shopping are causes of food insecurity, but we cannot determine this causality from our study. Longitudinal research would help determine the direction of these associations and better elucidate the mechanisms by which food insecurity is related to the psychosocial and physical well-being among older PLWH.

In summary, food insecurity was prevalent in more than one-third of older PLWH in this cross-sectional study, was associated with depression and key functional limitations, and demonstrated a trend toward association with frailty state. Notably, only a minority of food-insecure participants accessed community food and meal assistance programs, which points to a potential area for intervention. Older PLWH will benefit from food insecurity screening and assessment of their ability to store and prepare food; in the United States, resources to address and mitigate food insecurity include the Supplemental Nutritional Assistance Program, and/or community support programs such as local food pantries, congregate meals, which may be limited during COVID-19 surges, or home-delivered meals such as Meals on Wheels.

Older people with HIV can also take advantage of nutrition assistance and other programs sponsored by the Older Americans Act,¹³ which can be accessed through County Area Agencies on Aging, State Aging and Disability Resource Centers, and the Agency for Community Living's Eldercare Locator (<https://eldercare.acl.gov/>). Integration of multi-disciplinary expertise spanning the fields of social work, and nutrition science, is key to assist in the navigation and uptake of existing and novel support mechanisms.

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Authorship Confirmation Statement

All authors substantially contributed to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; and approve of the final article.

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