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# The Association of Food Insufficiency with Patient Activation Among Women Veterans Using Veterans Administration Healthcare: a Cross-Sectional Analysis

Kimberly Narain, MD, PhD, MPH[1,2], Kia Skrine Jeffers, RN, PhD, MSN[3,4],
Bevanne Bean-Mayberry, MD, MHS[1,2], Ismelda Canelo, MPA[2], Jill E. Darling, MSHS[2], and
Elizabeth M. Yano, PhD, MSPH[2,5]

[1]Division of General Internal Medicine and Health Services Research, Department of Medicine, David Geffen School of Medicine, University of California Los Angeles, Los Angeles, CA, USA; [2]VA HSR&D Center for the Study of Healthcare Innovation, Implementation, and Policy, VA Greater Los Angeles Healthcare System, 11301 Wilshire Blvd, Los Angeles, CA, USA; [3]National Clinician Scholars Program, University of California Los Angeles, Los Angeles, CA, USA; [4]School of Nursing, University of California Los Angeles, Los Angeles, CA, USA; [5]Department of Health Policy and Management, Fielding School of Public Health, University of California Los Angeles, Los Angeles, CA, USA.

## INTRODUCTION

Hibbard et al. (2004) conceptualizes the process of becoming "activated" as a linear process involving four stages: (1) belief that the patient role is important, (2) confidence and knowledge to take action, (3) taking action, and (4) staying the course under stress; however, patients that lack adequate resources may be unable to transition from stage 2 to stage 3.[1] In particular, individuals dealing with food insecurity—a household-level economic and social condition of limited or uncertain access to adequate food—may be unable to take action on dietary modifications recommended by their physicians despite increased knowledge.[2] This study aims to explore the relationship between food insufficiency—an inadequate amount of food intake due to lack of money or resources and patient activation.[3]

## METHODS

Data were drawn from the Women Veterans Health Utilization and Experience Survey (WV-HUES). The sample included women Veterans who had 3 or more primary care and/or Women's Health visits to one of 12 participating Veterans Affairs (VA) medical centers (12/2013–11/2014) who also responded to both the baseline (1/2014–3/2014) and 12-month follow-up (1/2015–3/2015) surveys ($N = 818$), since food insufficiency and patient activation questions were only asked during the 12-month survey.

Our measure of food insufficiency came from responses to the USDA food insufficiency screener, "Which of these statements best describes the food eaten in your household in the last 12 months?" An indicator variable for food insufficiency was coded as "1" if the individual responded in one of three ways to the abovementioned question: "Enough but not always the kinds of food we want," "Sometimes not enough to eat," or "Often not enough to eat." The indicator variable was coded as "0" if the individual responded, "Enough of the kinds of foods we want to eat." We use all 6 of the 22 Patient Activation Measure (PAM) items included in the survey as outcomes (Table 2). Respondents were asked how much they agree ("agree strongly," "agree somewhat," "disagree somewhat," "disagree strongly") with each of the PAM items. Separate indicator variables were created for each PAM item that were coded "1" if an individual responded "agree strongly" or "agree somewhat," and coded as "0" if they responded "disagree somewhat" or "disagree strongly." We considered several covariates that have been linked with food insufficiency and patient activation for inclusion in our statistical models (Table 1).

Chi-squared test (categorical variables) and $t$ test (continuous variables) were used to examine the un-adjusted relationships between food suffiency status and covariates. For our adjusted analyses, we used multiple logistic regression models, controlling for covariates that had statistically significant relationships with food insufficiency (race/ethnicity, employment, marital status, positive depression screen, and sexual trauma history). All analyses were weighted for complex survey design and non-response bias. A $p$ value $< 0.05$ was used to determine statistical significance. We show the results of our adjusted analyses as odds ratios.

## RESULTS

Twenty-eight percent of respondents were classified as food insufficient ("Enough but not always the kinds of food we want" (23.6%), "Sometimes not enough to eat" (3.9%), or "Often not enough to eat" (1.2%). Food insufficient individuals were found to be 54 and 52% less likely to respond "agree strongly" or "somewhat agree" to the PAM items "I have been able to maintain or keep up with lifestyle changes, like eating right or

**Table 1 Bivariate Analyses for Patient Characteristics Across Food Sufficiency Status**

| Patient characteristic or experience Mean (SD) or number (%) | Food insecure (N = 226) | Food secure (N = 592) | p value |
|---|---|---|---|
| Age | 54 (12.3) | 55 (13.5) | 0.17 |
| No college degree | 143 (63) | 340 (57) | 0.13 |
| College degree | 50 (22) | 148 (25) | 0.39 |
| Graduate degree | 33 (15) | 99 (17) | 0.46 |
| Married | 51 (23) | 225 (38) | 0.00 |
| Minor children | 41 (18) | 87 (15) | 0.23 |
| Officer rank (enlisted vs. officer) | 73 (32) | 231 (39) | 0.08 |
| Employed | 138 (61) | 453 (77) | 0.00 |
| Hispanic[1] | 11 (5) | 28 (5) | 0.95 |
| American Indian/Alaskan Native[1] | 18 (8) | 33 (6) | 0.21 |
| Native Hawaiian/Pacific Islander[1] | 2 (0.9) | 1 (0.2) | 0.13 |
| Asian/Asian-American[1] | 4 (2) | 4 (0.7) | 0.16 |
| Black/African-American[1] | 71 (32) | 125 (21) | 0.00 |
| White[1] | 144 (64) | 435 (74) | 0.00 |
| Substance abuse gender-tailored audit (score $\geq 3$ vs. < 3) | 207 (92) | 532 (90) | 0.45 |
| Sexual trauma (any sexual trauma vs. no sexual trauma) | 177 (78) | 406 (69) | 0.01 |
| +PTSD screen | 66 (29) | 140 (24) | 0.10 |
| + depression screen (PHQ-2 score > 2 vs. $\leq 2$) | 42 | 20 | 0.00 |
| Seattle comorbidity index score | 3.6 (2.6) | 3.5 (2.7) | 0.66 |

*The data source is the Women Veterans Health Utilization and Experience Survey, 12-month interview file. T test and chi-squared test were used to compare variable means and proportions respectively, across food insufficient and food sufficient women Veterans*
[1]*Race/ethnicity categories are not mutually exclusive*

exercising" and "I know how to prevent problems with my health", respectively (Table 2).

## DISCUSSION

**Table 2 Result of Adjusted Analyses Exploring the Relationship Between Food Sufficiency Status and Patient Activation**

| | | |
|---|---|---|
| I am confident I can help prevent or reduce problems associated with my health | 0.94 (0.53 to 1.67) | C[1] |
| I am confident that I can tell whether I need to go to the doctor or whether I can take care of a health problem myself | 0.69 (0.25 to 1.90) | C[1] |
| I am confident that I can follow through on medical treatments I may need to do at home | 0.70 (0.43 to 1.14) | C[1] |
| I have been able to maintain or keep up with lifestyle changes, like eating right or exercising | 0.46 (0.33 to 0.64) | T[1] |
| I know how to prevent problems with my health | 0.48 (0.26 to 0.90) | T[1] |
| I am confident I can figure out solutions when new problems arise with my health | 0.65 (0.39 to 1.08) | T[1] |

*The data source is the Women Veterans Health Utilization and Experience Survey, 12-month interview file (N = 818). The statistical model is a multiple logistic regression models, controlling for race/ethnicity, marital status, employment, depression screening status and sexual trauma history. Standard errors are adjusted for complex survey design and non-response bias. Estimates are presented as odds ratios. 95% confidence intervals are shown in parentheses. 1. Pertains to the PAM domain that the particular item maps to.[1]*
*C confidence and knowledge to take action, T taking action*

Food insufficiency may be a barrier to patient activation. This finding is important because it suggests that interventions to improve activation among vulnerable patients, that do not address food insufficiency, may achieve limited success. Programs that involve screening for food insecurity and linking patients that screen positive with social work have been piloted in some VA Homeless clinics but the results of this study suggest these interventions should be piloted in clinics serving large proportions of Women Veterans as well.[4] Limitations of the study include a cross-sectional study design, the use of a non-specific measure of food insufficiency, use of individual PAM items as outcomes, and the absence of measures for income and housing which could be potential confounders. Future studies should assess the longitudinal relationship between food insufficiency and patient activation in order to evaluate the causal nature of the relationship.

***Corresponding Author:*** *Kimberly Narain, MD, PhD, MPH; Division of General Internal Medicine and Health Services Research, Department of Medicine, David Geffen School of Medicine, University of California Los Angeles, Los Angeles, CA, USA (e-mail: knarain@mednet.ucla.edu).*

***Compliance with Ethical Standards:***

***Conflict of Interest:*** *The authors declare that they do not have a conflict of interest.*

***Disclaimer:*** *The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States government.*

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