LETTERS—CONCISE RESEARCH REPORTS

Examining the Association of Social Determinants of Health with Missed Clinic Visits in Patients with Heart Failure in the Veterans Health Administration

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BACKGROUND

Missed clinic visits, or no-shows, are a significant resource drain on the Veterans Health Administration (VA).[1] The VA reports that 15–18% of scheduled primary care appointments are not completed, costing an estimated half a billion dollars per year.[2] While some social determinants of health (SDOH) are shown to influence clinic no-show rates in other populations, no prior work has explored their effect among Veterans. Focusing on a cohort that require frequent clinic visits, our goal was to assess the association of three SDOH with missed clinic visits among Veterans hospitalized for congestive heart failure (CHF).

METHODS

From a national sample, we first identified all Veterans 65 and older who were hospitalized for hearth failure, then randomly selected 1500 hospitalized with a primary diagnosis of CHF in 2012. Based on previous work,[3] three SDOH (lives alone, social support, and housing situation) were extracted and verified through chart abstraction by two reviewers. We determined the number of missed clinic visits (primary care, general internal medicine, geriatrics, and cardiology) in the year prior to admission. Missed clinic visits were then dichotomized into those with ≤ 1 and ≥ 2. We utilized a multivariate logistic regression model to examine the effect of the SDOH on missing ≥2 scheduled clinic appointments, adjusting for previously described confounders:[4] age, race, the Charlson

Comorbidity Index (CCI), mental health disorders, substance abuse, and other SDOH covariates.

RESULTS

Of the 1500 patients, 1282 (85%) had ≤ 1 missed clinic visit, while 218 (14%) had ≥ 2 missed clinic visits in the assessed year. Patients with ≥ 2 missed clinic visits had higher prevalence of all three SDOH compared with those with ≤ 1 and were more commonly black (34% vs. 14%), while rates of poor mental health (25% vs. 25%) and underlying comorbid conditions (CCI; 8.06 (±2.59) vs. 8.43 (±2.63)) were equally present in both groups (Table 1). In a multivariate analysis, living alone (OR 1.71, 95% CI 1.21-2.41), marginal housing (OR 6.93, 95% CI 2.88–17.38), and being black (OR 2.71, 95% CI 1.38–5.75) were significantly associated with having ≥2 missed clinic appointments. Higher age was associated with lower odds (OR 0.96, 95% CI 0.94–0.98) of having ≥ 2 missed clinic visits (Table 2).

DISCUSSION

We found that elderly Veterans with CHF who were black, lived alone, and were marginally housed had increased likelihood of missing ≥ 2 clinic visits above and beyond other factors, such as mental health and other comorbid conditions. Given the VA's commitment to improving access to care, understanding which patient-level, non-clinical factors impact access outcomes remains important.

Missed clinic visits can have a significant effect on the health care system and on patient care. At the patient-level, the impact of missed clinic appointments on health is well known—with no-shows leading to interruptions in continuity of care and worsened health outcomes.[5] At a health care systems level, no-shows lead to scheduling and operational inefficiencies and reduced clinic productivity.[4]

Studies have shown that missed clinic visits can be improved through a wide array of interventions, including the use of mail, telephone, and text reminders, and open access

Table 1 Descriptive Characteristics. Missed Clinic Visits Were Tallied Over the Year Prior to Hospital Admission, *SD* Standard Deviation. Marginal Housing: an Individual Who Lacks a Fixed, Regular, and Adequate Nighttime Residence, or Who Lives in a Temporary or Transitional Housing, or Who Lives in a Place Not Meant for Human Habitation. Lacks Social Support: Evidence that a Patient Lacks Social Support with Family Members, Friends, or Community on a Consistent Basis. *SDOH* Social Determinant of Health. Substance Abuse Includes Alcohol or Drug Abuse

Descriptive characteristics			
	Prevalence	≤ 1 missed clinic visit, (N = 1282)	≥ 2 missed clinic visits, (N = 218)
Age, years (± SD)	–	78 (± 8.7)	75 (± 7.9)
Race			
White	1160	1027 (80%)	133 (61%)
Black	247	173 (14%)	74 (34%)
Other	90	79 (6%)	11 (5%)
Charlson Comorbidity Index	8.38 (±2.63)	8.43 (±2.63)	8.06 (±2.59)
Substance abuse	16%	179 (14%)	53 (24%)
Mental health disorders	25%	323 (25%)	54 (25%)
Lives alone	19%	225 (18%)	58 (26%)
Marginal Housing	1.5%	9 (< 1%)	14 (6%)
Lacks Social Support	< 1%	7 (< 1%)	5 (2%)

scheduling.[6] To create interventions that target those most at risk to miss appointments, it is important to understand the non-clinical factors that predict no-shows. Properly identifying those at highest risk and focusing such interventions will allow for a targeted, efficient use of resources.

There are limitations to this study. First, we focused on SDOH that may not be routinely documented by providers, thus limiting the sensitivity of the administrative codes. To address this, we collected data on these measures for 1 year prior to hospitalization to increase the likelihood of capturing this information. Second,

Table 2 Multivariate Analysis of Social Determinants and Missed Clinic Visits. Analysis Adjusted for the Following Baseline Characteristics: Age, Race, Charlson Comorbidity Index, Substance Abuse, Mental Health Disorders, and Other SDOH Covariates. *SDOH* Social Determinant of Health. Substance Abuse Includes Alcohol or Drug Abuse

Multivariate analysis		
	Odds of ≥ 2 missed clinic visit	
	Unadjusted analysis	Adjusted analysis
Age	*0.96 (0.94–0.97)	*0.96 (0.94–0.98)
Race		
White	Reference	Reference
Black	*3.3 (2.38–4.57)	*2.71 (1.38–5.75)
Other	1.08 (0.53–1.99)	0.92 (0.49–1.89)
Charlson Comorbidity Index	1.05 (0.93–1.12)	0.98 (0.92–1.04)
Substance abuse	*1.97 (1.39–2.78)	1.33 (0.90–1.94)
Mental health disorder	0.97 (0.69–1.37)	0.91 (0.63–1.28)
Lives alone	*1.70 (1.21–2.36)	*1.58 (1.10–2.24)
Marginal housing	*9.68 (4.19–23.52)	*5.69 (2.28–14.73)
Lacks social support	*4.27 (1.25–13.49)	2.51 (0.60–9.28)

*P < 0.05

our cohort is limited to older Veterans with CHF and our findings may not be generalizable to other populations.

In total, these results suggest that within the VA, SDOH impact patients' probability to miss clinic appointments independent of other factors. It is important that future work in this area consider scalable ways to expedite obtaining this information, either from the electronic health record or directly from the patient. Interventions and strategies for prevention tailored to Veterans with such SDOH may help improve missed clinic visit rates and subsequently improve delivery of care, while also reducing wasted time and clinical resources.

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Compliance with Ethical Standards:

Conflict of Interest: *The authors report no conflicts of interest in the submission of this manuscript*

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