

Original Article

Symptom Burden and Palliative Care Needs Among High-Risk Veterans With Multimorbidity



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Abstract

Context. Palliative care research has focused on patients with disease-specific conditions. However, older patients with multimorbidity may have unmet palliative care needs.

Objectives. We assessed symptom burden and quality of life among veterans with multimorbidity and sought to determine if their bothersome symptoms were addressed and treated in the primary care setting. We sought to identify specific diagnoses that may account for greater symptom burden. We hypothesized that patients with a higher number of diagnoses would experience greater symptom burden and poorer quality of life.

Methods. We identified veterans at high risk of hospitalization or death using a validated prognostic model. We administered cross-sectional surveys via telephone, The Memorial Symptom Assessment Scale—Short Form and Veterans RAND 12, to randomly selected patients in primary care in the VA Health Care System from May to December 2015. We assessed if their most bothersome symptom was addressed and treated during their most recent visit. Regression models identified specific diagnoses accounting for greater symptom burden and patient predictors of high symptom burden and poor quality of life.

Results. Patients ($n = 503$) reported (10.6 ± 5.5) active symptoms and poor physical quality of life. Patients reported pain and dyspnea as their most bothersome symptoms ($n = 145$ [29%] and $n = 57$ [11%], respectively). Most patients acknowledged their clinicians assessed ($n = 348$ [74%]) and treated ($n = 330$ [70%]) their most bothersome symptom. Physical symptoms (78%, $P < 0.0001$) were more likely to be addressed than psychological symptoms (55%, $P < 0.001$). Patients diagnosed with obesity or depression experienced greater physical symptom burden. Younger patients reported greater symptom severity than older patients ($P < 0.01$). Younger patients and those with greater multimorbidities reported lower self-perceived quality of health than older patients and those with fewer multimorbidities ($P = 0.01$ and $P < 0.01$, respectively).

Conclusion. Outpatients with multimorbidity have high symptom burden, unaddressed symptoms, poor quality of life, and unmet palliative care needs. Our findings support standardization of comprehensive symptom assessment and management in primary care for veterans with multimorbidities, which may ameliorate symptoms and improve quality of life. *J Pain Symptom Manage* 2019;57:880–889. © 2019 American Academy of Hospice and Palliative Medicine. Published by Elsevier Inc. All rights reserved.

Key Words

Multimorbidity, palliative care, symptom assessment, quality of life, primary health care

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Introduction

Palliative care research has largely focused on patients with disease-specific conditions such as advanced cancer, cardiac, or pulmonary diseases. As patients age, however, they often develop chronic conditions that may lead to decreases in health-related quality of life or symptoms such as pain and dyspnea. As the population ages, the prevalence of patients with multimorbidity also increases,¹ but these patients may not be identified as having palliative care needs.

The full spectrum of clinical management of older adults with multimorbidity includes not only management of their chronic conditions but also considers patients' functional ability, prognosis, and goals of care.² Systematic reviews and guidelines describe strategies to improve care for patients with multimorbidity, including specialty care coordination, medication reconciliation, self-management, and elimination of unnecessary testing and services²⁻⁴; however, there is a lack of standardized approaches to determine which aspects of clinical management are of the highest priority, while accounting for patients' preferences and goals.⁵ A person-centered approach to identify care priorities begins with addressing individuals' concerns including unaddressed or suboptimally treated symptoms. Addressing symptom burden is an important component of primary palliative care for older adults, which entails integrating palliative care principles into routine patient care. The provision of primary palliative care may improve symptom burden,⁶ functional ability,⁷ and quality of life.⁸ Research priorities for adults with multiple chronic conditions endorse the development of symptom assessment tools as a critical component to improve health-related quality of life.⁹

We sought to assess symptom burden and quality of life among patients at an elevated risk of hospital admission or death within the subsequent year using a validated prediction model. We determined whether these patients discussed bothersome symptoms at a routine outpatient visit with their primary care provider and whether their symptoms were addressed. We sought to identify specific diagnoses that may account for greater symptom burden. We hypothesized that patients with a higher number of diagnoses would experience greater symptom burden and poorer quality of life.

Methods

Design

We conducted cross-sectional telephone surveys and structured interviews to randomly selected patients at high risk of hospitalization or death within the subsequent year across four geographical regions of the U.S. enrolled in primary care clinics in the VA Health

Care System. The VA Puget Sound Health Care Institutional Review Board (#00780) approved the protocol.

Study Subjects

We selected patients to screen from the VA Corporate Data Warehouse (CDW) on a weekly basis from May to December 2015 using a prognostic model called the Care Assessment Needs (CAN) score.¹⁰ The score estimates the probability of death or hospital admission within a subsequent 12-month period for every veteran receiving primary care at the VA. The CAN score ranges from 0 to 100, with higher numbers indicating a higher risk for hospitalization or death. Our rationale for using the CAN score identification method is twofold: 1) all patients with multimorbidity may not have high care needs and 2) the score is a practical approach for primary care providers to identify patients requiring a higher level of care. We decided to use a CAN score of >90 (90% probability of hospitalization or death within the next one year) to include patients that may not otherwise be identified as having high needs. Patients with CAN scores of >90, with a nonurgent primary care clinic appointment within the next 30 days, and who were not admitted to the hospital at the time the data were extracted were selected. We subsequently mailed information sheets with opt-out cards 30 days before their clinic visit. For those who did not opt-out, we called patients two to five days after their clinic visit with their primary care provider to obtain informed consent and administer questionnaires. Patients were excluded from the study if they did not report to their scheduled primary care appointment, the CAN score dropped below 90 from the time of the original data pull, and they had an active psychiatric illness such as schizophrenia, cognitive disorders such as dementia, or hearing disability identified through CDW that could impede accurate self-report of symptoms.

We administered two surveys: 1) The Memorial Symptom Assessment Scale—Short Form (MSAS-SF)¹¹ and 2) Veterans RAND 12 (VR-12) to assess quality of life.¹² We asked patients to identify their most bothersome symptom from the MSAS-SF symptom list. Next, we asked if their most bothersome symptom was evaluated by their primary care provider at the latest primary care appointment and if it was being addressed. The average time of a phone call was 14 minutes (5 SD).

Measures

We assessed symptom presence during the week before the primary care appointment with the MSAS-SF.¹³ The scale is a 32-item validated survey with three subscales: Global Distress Index, Physical Symptoms,

and Psychological Symptoms. Respondents are asked to report if they have a symptom within the last week and if so, how “distressing or bothersome” the symptom is on a five-item Likert scale (0 to 4.) The total score is the average severity of symptoms within the past week, with symptoms not experienced scored as a zero. A higher score equates to greater symptom burden. Significant symptom burden is defined as a score >1 on any subscale of the MSAS-SF.¹¹ The MSAS-SF was developed and tested on 150 outpatient veterans diagnosed with cancer and was used in studies to measure symptom burden in noncancer populations, such as heart failure,¹⁴ COPD,¹⁵ and chronic kidney failure.¹⁶

We assessed health-related quality of life with the Veterans RAND (VR-12), a valid and reliable 12-item health survey tested on approximately 800,000 veterans.¹² The survey has a physical and mental component scale, each component score ranges from 0 to 50. The total score ranges from 0 to 100, a higher score equates to better health. Physical questions ask about activities such as pushing a vacuum or climbing stairs. A sample mental health question is “Have you felt downhearted and blue during the past 4 weeks?”

Our primary outcome was to examine symptom burden and quality of life and to determine whether patients perceived that their primary care clinician had assessed their most bothersome symptom at their most recent clinic appointment and whether the symptom was being addressed. Secondary outcomes were to identify specific diagnoses that may account for greater symptom burden and poorer quality of life, and patient predictors of high symptom burden (severity rated ≥ 3) and poor quality of life.

Predictors/Covariates

Patient-level covariates included age, race, gender, U.S. geographical regions, and the number of diagnoses counted by Elixhauser diagnoses categories. The Elixhauser index is a method of categorizing comorbidities based on ICD-9 and ICD-10 diagnoses codes during medical visits and hospitalizations.¹⁷ The 31 comorbidity categories are all dichotomous.¹⁸ We combined two Elixhauser disease categories, diabetes with complications and without complications and hypertension with complications and without complications. We collected Elixhauser diagnoses from CDW one year retrospectively from collection of the CAN scores and demographic data.

Analysis

Frequencies and percentages were calculated on all surveys, patient characteristics, patients' most bothersome symptom, and their perception of symptom assessment and management. Symptoms on the MSAS-SF were divided into physical and psychological

domains. Chi-squared tests were used to determine whether the proportions of the most bothersome symptoms that were addressed and treated were associated with the symptom's domain. Logistic regression was used to model associations between patient-level covariates and reporting of at least one severe (≥ 3) symptom within the given domain. Logistic regression was also used to model associations between patient-level covariates and reporting of “a little” or “a lot” of limitation in specific quality-of-life constructs from the VR-12: moderate activities and climbing stairs. Ordinal logistic regression was used to model associations between patient-level covariates and reporting of self-perceived health (poor, fair, or good) and mood (never, occasionally, or often feeling downhearted or blue) from the VR-12. Self-perceived health and limitations in moderate activities and stair climbing were used as predictors of physical and psychological symptom burden in linear regression models, adjusting for age, race, gender, and region. Finally, we modeled variation in physical symptom burden with univariate linear regression using as covariates the 10 most prevalent individual diagnoses. All tests were two-tailed, and a P value of <0.05 was considered significant. Analyses were performed in R 3.4.2[©] using the MASS package `polr()` function for ordinal logistic regression.¹⁹

Results

We mailed invitations over a seven-month recruitment period to 3327 patients meeting eligibility criteria to participate in the study. Among those originally invited, 1235 were ineligible after further screening because of a change in the primary care appointment date or a CAN score that dropped <90 , 19 had undeliverable invitations, 693 declined to participate, and 17 were hospitalized. We telephoned 1380 patients, of whom 453 declined for unknown reasons, 375 were unreachable, and 49 had a hearing disability preventing completion of the call. Nonparticipants on average were aged 75 years, had four diagnoses, and a CAN score of 93%. Five-hundred and three patients (36%) completed the study (Fig. 1).

Patients ($n = 503$) were white (74%), males (97%), aged 71.1 (11.1 SD) years, range 30–94 (Table 1). Patients had on average 4.8 (2.3 SD) diagnoses, range 0–12, based on Elixhauser categories and an average CAN score of 94%. Patients reported a significant number of symptoms ($n = 10.6 \pm 5.5$) in the past week. The most bothersome symptoms included patient reports of pain ($n = 145$, 29%), dyspnea ($n = 57$, 11%), emotional distress ($n = 53$, 10%), and lack of energy ($n = 52$, 10%). Three-hundred and forty-eight (74%) patients reported their clinician

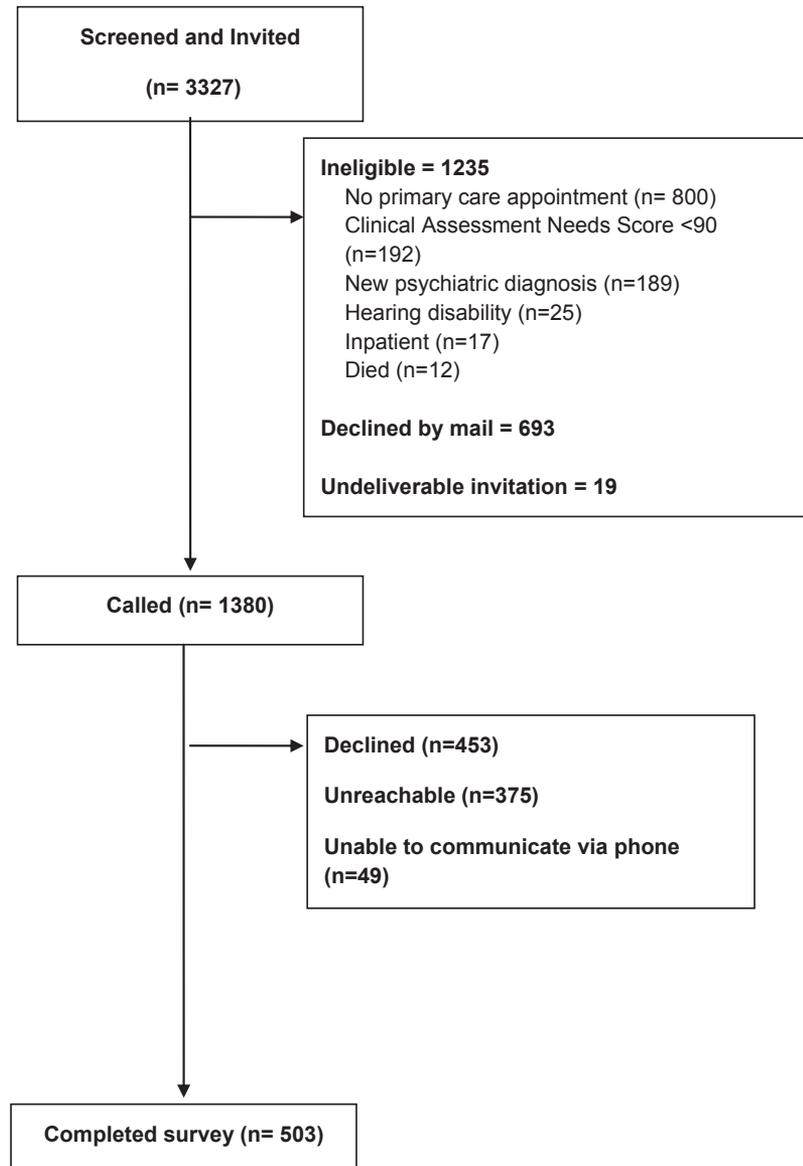


Fig. 1. Participant eligibility.

assessed their most bothersome symptom at the latest clinic appointment, and 330 (70%) reported they were receiving treatment for the symptom. Patients reporting physical symptoms as their most bothersome were more frequently assessed (78%) and treated (73%) than those reporting psychological symptoms (assessed 55%, $P < 0.0001$) and (treated 55%, $P = 0.001$).

The average MSAS-SF total score was 0.94 (0.62 SD). The average physical symptom subscale was 1.02 (0.66 SD), indicating significant symptoms, and the average psychological subscale was 0.99 (0.97 SD). The average physical quality-of-life score measured by the VR-12 was 28.6 (11.4 SD), and average psychological quality-of-life score was 49.5 (13.7 SD) (Table 2).

Model Results

We found patients who were younger had a higher probability of reporting at least one symptom, either physical ($P < 0.01$) or psychological ($P < 0.01$), as being severe as compared with older patients. Patients with a higher number of multimorbidities reported greater limitations in the ability to engage in moderate activities ($P = 0.01$), such as pushing a vacuum or climbing stairs ($P = 0.05$), compared with patients with fewer diagnoses. Younger patients ($P = 0.01$) and those with a greater number of multimorbidities ($P < 0.01$) perceived themselves as having worse health than older patients and those with fewer multimorbidities (Table 3). Patients who experienced limitations in their ability to engage in moderate activities

Table 1
Patient Characteristics (N = 503)

Characteristics	Value
Age, mean ± SD, range	71.1 ± 11.2, 30–94 yrs
Male, n (%)	490 (97)
Race, n (%)	
White	374 (74)
Black	85 (17)
Unknown	44 (8)
Geographical region, n (%)	
Mountain West	134 (27)
Central	131 (26)
Central South	131 (26)
Northeast	107 (21)
Diagnoses (Elixhauser), mean ± SD, range	4.8 ± 2.3, 0–12
Hypertension, n (%)	443 (88)
Diabetes	415 (83)
Chronic pulmonary disease	190 (38)
Cardiac arrhythmia	155 (31)
Depression	141 (28)
Obesity	139 (28)
Renal failure	125 (25)
Congestive heart failure	116 (23)
Solid tumor without metastases	116 (23)
Peripheral vascular disorders	92 (18)
Symptom prevalence, n (%)	
Pain	152 (30)
Dyspnea	57 (11)
Emotional distress (sad, worried, irritable, nervous)	53 (10)
Lack of energy	52 (10)
Numbness	21 (4)
Sleeping difficulties	17 (3)
Other (gait, balance, hearing, vision)	91 (18)

and climb stairs, as well as those with worse self-perceived health, reported greater physical and psychological symptom burden, on average (Table 4). Finally, the R^2 coefficients of determination from univariate linear regression modeling assessing variation in symptom burden by diagnosis were low except those relating to depression ($R^2 = 0.112$, $P < 0.01$)

and obesity ($R^2 = 0.018$, $P = 0.003$). The coefficient estimates for depression and obesity imply positive correlations between these two diagnoses and the degree of physical symptom burden.

Discussion

We found patients with multimorbidity (on average five diagnoses) reported high symptom burden, poor physical function, and low quality of life. Among the 503 patients, 26% reported their most bothersome symptom was not assessed by their primary care clinician at their last clinic appointment, and 30% reported this symptom was not being treated. Patients reporting physical symptoms as their most bothersome were more likely to perceive their clinician addressed and was treating their symptom compared with patients reporting psychological symptoms. Our results call for a standardized approach to assess and palliate both physical and psychological symptoms and quality of life among patients with multimorbidity in the primary care setting. These results justify a call for studying the potential benefits of the provision of primary palliative care interventions in patients with multimorbidity.

We found several patient characteristics predictive of high symptom burden, the ability to engage in daily activities, and poor self-perception of health. Patients with a greater number of diagnoses and symptoms had greater limitations in climbing stairs and performing household chores and had poor self-perceived quality of life. Our findings are consistent with results of other studies examining symptom burden, self-management, and quality-of-life outcomes in adults with multimorbidity^{20–24} while also highlighting unique findings. We found younger patients reported a greater number and more severe physical and psychological symptom burden and lower perception of

Table 2
Survey Scores

	N = 503	Historical Data ^a
	Mean (SD)	Mean (SD)
Memorial Symptom Assessment Scale (MSAS)		
Total MSAS	0.94 (0.62)	0.70 (0.51)
Global Distress Index (10 items)	1.21 (0.78)	1.06 (0.79)
Physical Symptom Subscale (12 items)	1.02 (0.66)	0.92 (0.76)
Psychological Symptom Subscale (6 items)	0.99 (0.97)	0.76 (0.79)
Number of symptoms	10.6 (5.3)	9.80 (5.75)
Veterans Rand 12-item Health Survey (VR12)		
Physical Component Scale	28.6 (11.4)	35.6 (12.1)
Mental Component Scale	49.5 (13.7)	44.9 (13.8)

MSAS total is the average of symptom scores (32 items, range 0–4 Likert scale; higher score = worse health). Subscale score >1 = significant symptom burden. MSAS Global Distress Index = feeling sad, worrying, feeling irritable, feeling nervous, lack of appetite, lack of energy, pain, feeling drowsy, constipation, and dry mouth.

MSAS Physical = lack of appetite, lack of energy, pain, feeling drowsy, constipation, dry mouth, nausea, vomiting, change in taste, weight loss, feeling bloated, and dizziness.

MSAS Psychological = worrying, feeling sad, feeling nervous, difficulty sleeping, feeling irritable, and difficulty concentrating.

^aFor MSAS, historical data population: outpatient veterans with cancer, $n = 150$ (149 male); and for VR12, reference population: approximately 860,000 veterans—VR12, range 0–50 for each component scale; higher score = better health.

Table 3
Regression Models for Primary Outcomes

Statistical Model	Elixhauser Comorbidity Count	Age	Race: Nonwhite/ Unknown	Gender: Male	Region: 2	Region: 3	Region: 4
	Covariate Coefficient Estimate (95% Confidence Interval)						
Physical symptom burden ^a	0.05 (−0.04, 0.15)	−0.05 (−0.07, −0.03) ^b	0.23 (−0.24, 0.69)	−14.95 (NA, 28.48)	−0.18 (−0.73, 0.36)	0.56 (−0.02, 1.15)	−0.29 (−0.85, 0.27)
Logistic regression Psychological symptom burden ^a	0.04 (−0.04, 0.13)	−0.05 (−0.07, −0.04) ^b	−0.10 (−0.55, 0.33)	−1.45 (−4.39, 0.28)	−0.27 (−0.78, 0.24)	0.22 (−0.30, 0.75)	−0.06 (−0.60, 0.48)
Logistic regression Moderate activities limitations	0.14 (0.03, 0.26) ^b	0.00 (−0.03, 0.02)	0.09 (−0.45, 0.61)	−0.96 (−3.90, 0.75)	−0.26 (−0.91, 0.38)	0.04 (−0.64, 0.71)	−0.49 (−1.16, 0.16)
Logistic regression Stair-climbing limitations	0.12 (0.00, 0.23) ^b	0.00 (−0.02, 0.02)	0.00 (−0.57, 0.54)	−0.93 (−3.86, 0.78)	−0.16 (−0.81, 0.50)	0.09 (−0.58, 0.78)	−0.20 (−0.89, 0.48)
Logistic regression Self-perceived health status	−0.16 (−0.23, −0.08) ^b	0.02 (−0.01, 0.04) ^b	−0.22 (−0.61, 0.16)	−0.22 (−1.22, 0.77)	−0.01 (−0.47, 0.45)	−0.23 (−0.69, 0.23)	0.54 (0.05, 1.03) ^b
Ordinal logistic regression, Poor → Fair → Good	−0.01 (−0.08, 0.07)	−0.06 (−0.08, −0.04) ^b	−0.07 (−0.45, 0.32)	−1.23 (−2.49, 0.10) ^b	0.13 (−0.33, 0.59)	0.54 (0.08, 1.01) ^b	−0.06 (−0.55, 0.43)
Ordinal logistic regression, Never → Occasionally → Often							

^aPhysical and psychological symptom burden dichotomized based on whether at least one symptom was rated ≥ 3 indicating severe.

^bStatistically significant ($\alpha = 0.05$) results. Referent groups for race, gender, and region are white, female, and 1 (Mountain West), respectively. Region 2 = Central States, Region 3 = Central-Southern States, Region 4 = Northwest States.

Table 4
Regression Models of Symptom Burden Counts

	Physical Symptom Burden Models			Psychological Symptom Burden Models		
	Moderate Activities Model	Climbing- Stairs Model	Self-Perceived Health Model	Moderate Activities Model	Climbing- Stairs Model	Self-Perceived Health Model
Covariate	Covariate Coefficient Estimate (95% Confidence Interval)			Covariate Coefficient Estimate (95% Confidence Interval)		
Limitation in moderate activities	0.44 (0.28, 0.60) ^a	0.42 (0.25, 0.59) ^a	-0.22 (-0.38, -0.05) ^a	0.46 (0.25, 0.68) ^a	0.36 (0.14, 0.58) ^a	-0.32 (-0.54, -0.09) ^a
Limitation in climbing stairs			-0.58 (-0.75, -0.42) ^a			-0.65 (-0.87, -0.43) ^a
Self-perceived health: Fair			-0.01 (-0.02, 0.00) ^a			-0.02 (-0.03, -0.01) ^a
Self-perceived health: Good			-0.09 (-0.24, 0.06)			-0.05 (-0.25, 0.15)
Age	-0.01 (-0.02, -0.01) ^a	-0.01 (-0.02, -0.01) ^a	-0.01 (-0.02, 0.00) ^a	-0.02 (-0.04, -0.01) ^a	-0.03 (-0.04, -0.01) ^a	-0.02 (-0.03, -0.01) ^a
Race: White	-0.10 (-0.25, 0.06)	-0.08 (-0.24, 0.07)	-0.09 (-0.24, 0.06)	-0.06 (-0.26, 0.15)	-0.04 (-0.25, 0.17)	-0.05 (-0.25, 0.15)
Gender: Male	-0.68 (-1.54, 0.17)	-0.68 (-1.54, 0.18)	-0.68 (-1.52, 0.15)	-0.75 (-1.89, 0.40)	-0.76 (-1.91, 0.40)	-0.79 (-1.92, 0.33)
Region: 2	-0.04 (-0.22, 0.13)	-0.07 (-0.24, 0.11)	-0.05 (-0.22, 0.12)	-0.12 (-0.35, 0.12)	-0.14 (-0.38, 0.09)	-0.12 (-0.35, 0.11)
Region: 3	0.15 (-0.03, 0.32)	0.12 (-0.05, 0.30)	0.12 (-0.05, 0.29)	0.12 (-0.11, 0.35)	0.09 (-0.14, 0.33)	0.09 (-0.14, 0.31)
Region: 4	-0.10 (-0.28, 0.09)	-0.14 (-0.32, 0.05)	-0.06 (-0.24, 0.11)	-0.04 (-0.28, 0.21)	-0.08 (-0.33, 0.16)	0.00 (-0.24, 0.24)

^aStatistically significant ($\alpha = 0.05$) results. Referent groups for race, gender, and region are white, female, and 1 (Mountain West), respectively. Region 2 = Central States, Region 3 = Central-Southern States, Region 4 = Northwest States.

their health than older patients. This finding has been shown in a small number of quality-of-life studies^{25,26} implying older age may not be a predictor of symptom burden and poor quality of life in patients with multimorbidity.

Our finding that obesity and depression significantly correlate with the degree of physical symptom burden is noteworthy. Obesity and depression are two highly prevalent diagnoses that, if left untreated, result in higher morbidity and poor patient outcomes.²⁷⁻²⁹ Forjaz et al.³⁰ examined the relationships between chronic conditions, disability, and quality of life among older patients with multimorbidity. These authors found that osteoarticular conditions causing pain and mental health disorders including depression had a negative effect on disability and quality of life. Several studies focusing on interventions such as multidisciplinary team work or self-management for patients with multimorbidity found no improvement in clinical outcomes, health service use, medication adherence, patient-related health behaviors, or cost, although patient satisfaction with the health care experience improved.^{31,32} Interventions designed to target active symptoms, such as pain^{4,33} or depression,³⁴ and interventions focusing on improving everyday functioning are recommended by professional geriatric societies.³⁵

Most palliative care studies focus on assessing and managing symptom burden in single conditions, such as advanced cancer, cardiac, or pulmonary diseases.^{14,36-39} Although these studies include patients with comorbidities, the interventions and outcome measures were disease specific. These studies provide evidence that managing symptoms, such as pain, dyspnea, or depression improves quality of life.^{36,40,41} Our findings support our hypothesis that veterans with multimorbidity have high symptom burden, unaddressed symptoms, and poor quality of life. Studies conducted on nonveteran populations confirm our findings.^{42,43} Portz et al.⁷ examined symptom burden and functional status among a cohort of patients diagnosed with cancer and multimorbidity. Patients with multimorbidity experienced greater symptom burden than patients with cancer. Interestingly, the authors found that poor functional status was associated with higher symptom burden but not multimorbidity, underscoring the importance of clinical attention to symptom management in patients with multimorbidity. Collectively, these results suggest that patients with multimorbidity may benefit from attention to symptom and quality-of-life assessment as much as patients with advanced cancers or single chronic conditions and should be considered as a category of patients who may have palliative care needs that could be addressed from a comprehensive palliative care evaluation.

Our results support a growing emphasis from professional organizations^{35,44,45} and the National Academy of Medicine to improve access to palliative care in all care settings by integrating palliative care principles of which quality of life and symptom assessment and management are key domains; however, successful integration of palliative care into routine care for patients with multimorbidities requires addressing provider and system-level barriers. Owing to the workforce shortage of palliative care specialists, all clinicians need to be educated on the principles of palliative care. Several organizations offer primary palliative care education, such as End of Life Nursing Education Consortium (ELNEC),⁴⁶ Center to Advance Palliative Care (CAPC),⁴⁷ and VitalTalk[®].⁴⁸

Practical methods of identifying patients with the highest palliative care needs is an important system-level challenge. Several health care systems are using predictive models to identify patients with high care needs.^{10,49} Alonso-Moran et al.⁵⁰ applied a risk stratification tool and identified patients diagnosed with chronic obstructive pulmonary disease, heart failure, cardiovascular disease, or diabetes who were at high risk of hospitalization or readmission. Dudley et al.²⁴ identified patients aged 75 years or older, three or more chronic advanced illnesses with commonly occurring symptoms, and lower socioeconomic status as individuals that may benefit from primary palliative care. Bayless et al.²¹ recommended conducting regular assessment of patients' activities of daily living, functional ability, and frailty using clinical measurements to identify patients with high care needs. The method of identifying patients with palliative care needs will likely depend on the clinical setting, patient population, and the availability of system-level tools.

In addition to increasing palliative care competencies of primary care providers, other members of the interdisciplinary team may be able to help manage care for older patients with multimorbidity. Utilizing nurses, physical and occupational therapists, pharmacists, and social workers to conduct comprehensive assessments can alleviate the workload of primary care clinicians. Finally, the adoption of nurse-driven, evidence-based³⁴ protocols⁴⁵ to manage symptoms for patients with chronic diseases are effective approaches to team-based care delivery.^{51–53} Examples of nurse-driven protocols that improve health care outcomes include heart failure and diabetes. Nurse-driven protocols promote nurses practicing at their highest scope of practice⁵⁴ and may increase access and effectiveness of care for patients with multiple chronic diseases.

There are several strengths and limitations to this study. The sample size is large and represents a geographically diverse range of patients. We acknowledge the possibility of response bias due to the large number of invited participants who declined to

participate. Although we could not solicit why eligible subjects declined participation, nonresponders were similar to respondents in terms of average age, the number of diagnoses, and CAN score. To minimize recall bias, we interviewed patients two to five days after a primary care visit; however, patients' self-report of symptom assessment and management was not validated by medical record documentation. We applied a prognostic model to identify patients at high risk of hospitalization or death in the subsequent year and successfully detected patients with three or more chronic diagnoses; however, this method may have resulted in selection bias. We collected diagnoses using a validated method of extracting Elixhauser categories from the medical record; however, this approach did not capture all disease categories. Thus, we examined individual patients that did not fall into a disease category confirming all but six patients had three or more diagnoses. A possible explanation for patients having a CAN score ≥ 90 and less than three diagnoses may be attributed to variables in the predictive model such as abnormal vital signs or laboratory values without a definitive diagnosis. The cohort consisted entirely of veterans, thus decreasing the generalizability of our findings to nonveteran populations; however, this is a significant population as the Department of Veterans Affairs is the largest integrated health care system in the U.S.⁵⁵ In addition, the symptom and quality-of-life instruments used in the study were validated in veterans. Finally, the cross-sectional study design prohibits causal inference.

In summary, our findings demonstrate patients with greater multimorbidities experience high symptom burden, poor quality of life, and inadequate symptom assessment and management. We identified gaps in care and opportunities to improve the delivery of primary palliative care to patients with multimorbidity at high risk of hospitalization or death. Implementation of comprehensive symptom assessment and management in primary care settings for patients with multimorbidities may ameliorate symptoms, resulting in improved functional status, higher quality of life, and improved satisfaction with care.

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