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Pain, Depression, and Fatigue in Community-Dwelling Adults With and Without a History of Cancer

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Abstract

The State of the Science Report by the National Cancer Institute on Symptom Management in Cancer identified gaps in understanding the epidemiology of pain, depression, and fatigue, and called for studies that will identify the extent of risk for these symptoms among those with cancer relative to other populations. Using year 2000 data from the Health and Retirement Study, a survey of a nationally representative sample of adults aged ≥ 50 , we evaluated whether respondents with a history of cancer had excess risk for pain, depression, and fatigue compared to those without a history of cancer. We also compared clustering/co-occurrence of symptoms. Controlling for the confounding effects of comorbidities, sociodemographic, and access to care factors, respondents with a history of cancer had higher risk for fatigue (OR = 1.45; 95% CI = 1.29, 1.63), depression (OR = 1.21; 95% CI = 1.06, 1.37), and pain (OR = 1.15; 95% CI = 1.03, 1.28). Symptom clusters were also more prevalent among those with a history of cancer ($P < 0.001$), with the pain-depression-fatigue cluster as most prevalent.

Keywords

Pain; depression; fatigue; symptoms; cancer; symptom clusters; epidemiology; community-dwelling; middle-aged; aging; population-based; survey; ethnicity

Introduction

Patients with cancer typically experience multiple symptoms related to cancer and cancer treatment.¹⁻⁵ Symptoms are what patients report as the subjective negative feelings, including physical (e.g., pain, shortness of breath), cognitive (e.g., delirium, memory problems, impaired

concentration), and affective (e.g., depression, anxiety) experiences associated with the disease and its treatments. Common symptoms of cancer and cancer treatment significantly impair the daily function and quality of life of patients.^{1,6-10} Untreated symptoms may negatively influence treatment effectiveness by interrupting treatment,¹¹ and may also add substantially to the cost of treatment. Undertreatment of symptoms has become a major health problem in its own right.

Pain, depression, and fatigue are prevalent and debilitating symptoms reported by patients with cancer. Little is known, however, about the prevalence of pain, depression, and fatigue among community-dwelling adults with cancer relative to other populations. Despite advances in the understanding of the epidemiology of cancer, research on the epidemiology of cancer-related symptoms has not kept pace.¹²

The State of the Science Report by the National Cancer Institute, "Symptom Management in Cancer: Pain, Depression and Fatigue,"^{13,14} called for symptom studies that will help identify the extent of risk for pain, depression, and fatigue among those with cancer. An identified gap is whether the incidence and/or prevalence of pain, depression, and fatigue are higher among those with cancer compared to populations without cancer. The report also underscored the need for studies of symptoms in populations of sufficient sample size that will provide more accurate estimates of the prevalence of pain, depression, and fatigue. Further, very little is known on the extent to which pain, depression, and fatigue occur alone or in combination, in people with cancer vs. populations without cancer, and the impact of coexisting medical conditions and patient characteristics in the occurrence of these symptoms.¹⁵

To address these gaps, we used a nationally representative data of community-dwelling adults in the United States from the Health and Retirement Study (HRS). HRS is a large population-based survey that provides comprehensive information on symptoms (pain, depression, fatigue), chronic diseases (cancer, hypertension, etc.), sociodemographic variables (age, race, gender, education, etc.), and access to health care factors (insurance status). Using data for the year 2000, we specifically assessed the extent to which the prevalence of pain, depression, and fatigue is higher among community-dwelling adults with a history of cancer compared to those without a history of cancer, while controlling for factors (e.g., sociodemographic factors, coexisting medical conditions, and access to care) known to confound these relationships. We also sought to examine the co-occurrence of pain, depression, and fatigue in this community sample.

Given the growing number of cancer survivors in the United States, an estimated 9.6 million persons, understanding the symptom experiences of the community-dwelling adults with cancer are critical to efforts in reducing the burden of cancer and its treatment.¹⁶

Methods

Sample

This was a cross-sectional study of public release data for the year 2000 of the HRS.¹⁷ Sponsored by the National Institute of Aging (NIA) and conducted by the Institute of Social Research at the University of Michigan, the HRS surveys a study population comprising community-dwelling adults in the contiguous United States. Data are collected either by telephone or by face-to-face survey every 2 years. Four subsamples represent different age groups: those born in 1923 or earlier; those born in 1924 through 1930; those born in 1931 through 1941; and those born in 1942 through 1947. Both the age-eligible respondent and their spouses are interviewed. We restricted our analysis to the year 2000 data because information on pain, depression, and fatigue was collected from all respondents during this particular year. (Only a subsample of respondents was asked about fatigue during the other years.) The health

status (B-R), cognition (C-R), and demographics (A-R) and the 1998 preload (PR-R) files were used in these analyses. The study response rate was 88%. Using respondents with information on cancer status, our total sample size for this study was 17,210. More details about the subsamples and the sampling methodology are available at <http://hrsonline.isr.umich.edu>.

Study Variables

The main outcome variables included pain, depression, and fatigue. *Pain* was defined by the response to the question, “Are you often troubled with pain?” *Fatigue* was defined by the response to the question, “Have you had any of the following persistent or troublesome problems...severe fatigue or exhaustion.” *Depression* was defined by the respondent’s summary score on a subset of the 20 original questions from the Center for Epidemiologic Studies on Depression (CES-D). The 20-item CES-D scale measures a continuum of psychological distress (symptoms of depression and anxiety), rather than determining the presence of psychiatric disorders. Only eight items (ranging from 0 to 8, with “0” indicating no depression) of the 20-item CES-D scale were collected in the HRS study. HRS reports that psychometric analyses of CES-D data showed a score of “4” as cut-point for depression.¹⁷ We based our definition of *symptom clusters* from the original conceptualization by Dodd and colleagues,^{4,18} as the presence or occurrence of two or more symptoms. In this study, symptom clusters included both pain and fatigue; both pain and depression; both fatigue and depression; or pain, depression, and fatigue.

Cancer status was our main independent variable and was measured by the response to the question, “Has a doctor ever told you that you have cancer or a malignant tumor of any kind except skin cancer?”

Covariates

Comorbidity status was defined by the response to the question, “Has a doctor ever told you that you have (i.e., diabetes, heart conditions, hypertension, lung diseases, stroke, arthritis)?” We collapsed these disease conditions to create a summary scale indicating the reported number of conditions, with a minimum score of 0 for not reporting any of the diseases to a maximum of 6 for reporting all of the diseases. The decision was made to create a summary scale for chronic diseases since we are mainly interested in assessing whether having a number of coexisting medical conditions, rather than the presence of a specific condition, is associated with symptom outcomes. Further, there is significant collinearity, i.e., dependence, in the disease conditions (e.g., diabetes and heart disease; stroke and heart disease).¹⁹

Sociodemographic variables included age, race/ ethnicity, gender, and education. Age cutpoints for the older group were based on the NIA categorization. The NIA, recognizing that the health experiences of aging populations differ and that age and age-related factors are important in assessing the health experiences within the aging populations, created categories for the different age groups of older adults: “older adults” for those aged 65–74 years; “old-old” adults for those aged 75–85 years; and “oldest-old” for those aged 85 and over). Race/ ethnicity categorization consisted of White non-Hispanic, Black non-Hispanic, and Hispanic. Given the small sample for categories such as American Indian or Alaskan Native, Asian, and Native Hawaiian or other Pacific Islander ($n = 248$), these categories were not included in this study. Categorization for educational status consisted of no schooling, 1–11th grade, 12th grade, some college, college graduate, and postgraduate schooling.

Access to care was defined by whether the respondent had Medicare or other insurance (such as self-employment or employer-provided insurance); Medicaid (insurance provided for the poor or the disabled); or did not have any insurance.

Statistical Analyses

Descriptive statistics were used to characterize the study population. Chi-squared analyses were conducted to compare those with and without a history of cancer on the prevalence of self-reported pain, depression, and fatigue. To control for Type I error rates, we used a modified Bonferroni approach with the level of significance adjusted from the customary 0.05 to 0.007 (0.05/7), given the number of tests conducted. The risk for pain, depression, and fatigue among those with a history of cancer relative to those without a history of cancer was determined by conducting separate logistic regression analyses for pain, depression, and fatigue, controlling for coexisting medical conditions, sociodemographic characteristics, and access to care.

We also compared the occurrence of pain, depression, and fatigue (as a cluster) among those with a history of cancer and without a history of cancer by Chi-squared tests. An affirmative response to any two or more questions on symptoms during the survey (both pain and fatigue; both pain and depression; both fatigue and depression; pain, depression, and fatigue) comprised the symptom clusters.

Lastly, we assessed the relationship between coexisting medical conditions, sociodemographic, and access to care factors, and the occurrence of any of the symptom cluster (two or more symptoms). We included only those cases that had information on all the variables of interest ($n = 14,025$). Using hierarchical logistic modeling, the relationship between having a history of cancer and the prevalence of any of these symptoms was assessed first (Model 1) and other variables that could potentially influence the relationship between cancer status and the occurrence of symptom clusters were subsequently added. The following was the order in which the covariates were added: age (Model 2), gender (Model 3), race (Model 4), education (Model 5), insurance status (Model 6), and number of coexisting medical conditions (Model 7). All analyses were conducted using Stata.²⁰ Stata's survey command was used to account for the survey sampling design.

Results

Twelve and a half percent of the sample reported having been diagnosed with cancer. Table 1 shows a comparison of sociodemographic characteristics, access to care, and coexisting medical conditions for those with and without a history of cancer ($n = 17,210$). Most of those without a history of cancer were from the younger age group (51–64 years old). There were more males than females without cancer. For both groups, a majority of the respondents were white non-Hispanics and at least 60% had a 12th grade education or higher and a majority had Medicare or other type of health insurance. Those with a history of cancer had more coexisting medical conditions than those without a history of cancer. Chi-squared analyses showed statistically significant differences in age and racial/ethnic distribution, education, insurance status, and in the number of coexisting medical conditions between those with and without a history of cancer.

Prevalence of Pain, Depression, and Fatigue Among Those With and Without a History of Cancer

Table 2 compares the prevalence of pain, depression, and fatigue between those with and without a history of cancer. Overall, those with a history of cancer had a higher prevalence of pain (33% vs. 29%; $P < 0.0001$), depression (21% vs. 18%; $P < 0.0001$), and fatigue (25% vs. 18%; $P < 0.0001$) compared to those without a history of cancer. About a third of those with a history of cancer reported pain, a fourth reported fatigue, and about a fifth reported depression. Overall, pain was the most prevalent symptom for both groups. However, among those with a history of cancer, fatigue was the second most prevalent symptom and lastly, depression. In

contrast, among those without a history of cancer, the same proportion of respondents reported depression and fatigue.

The magnitude of difference in the prevalence of these symptoms between those with and without a history of cancer was highest for fatigue (25% for those with a history of cancer vs. 18% for those without a history of cancer), followed by pain (33% vs. 29%), and lastly depression (21% vs. 18%).

Table 3 shows the prevalence of pain, depression, and fatigue between those with and without a history of cancer across different comorbidities. Overall, a greater proportion of those with a history of cancer had higher prevalence of these symptoms across all types of comorbidities.

Multivariate Analyses: Risks for Pain, Depression, and Fatigue

Table 4 shows the results of separate logistic regression analyses for pain, depression, and fatigue. Controlling for coexisting medical conditions sociodemographic and access to care factors, those with a history of cancer had higher risk for pain (OR = 1.15; 95% CI = 1.03, 1.28), depression (OR = 1.21; 95% CI = 1.06, 1.37), and fatigue (OR = 1.45; 95% CI = 1.29, 1.63).

Prevalence of Symptom Clusters

As shown in Table 5, we created mutually exclusive categories for the co-occurrence of pain, depression, and fatigue (as clusters), among those with and without a history of cancer. Statistically significant differences ($P < 0.001$) were observed for the occurrence of pain and fatigue cluster, fatigue and depression cluster, and pain-depression-fatigue cluster between those with and without cancer.

Multivariate Analyses: Predictors of Symptom Clusters (Two or More Symptoms)

We assessed the role of sociodemographic factors, coexisting medical conditions, and access to care to the occurrence of symptom clusters (two or more symptoms). As shown in Table 6, those with a history of cancer are 1.37 times at risk for symptom clusters (Model 1). In Model 2, the addition of age altered the magnitude (from OR = 1.37 to OR = 1.339) of the association between having a history of cancer and risk for symptom clusters. Even after controlling for the influence of gender, race, and education in Models 3–5, those with a history of cancer had 1.43 times the risk for symptom clusters relative to those without a history of cancer. Females, minorities, and those with lower educational levels were shown to be at a significantly greater risk for symptom clusters.

When insurance status (having Medicare or any insurance, Medicaid, or not having any insurance) was added (Model 6), those with a history of cancer remained at a greater risk, with the risk up to 1.43 times greater than those without a history of cancer.

Finally, although the impact of coexisting medical conditions altered the magnitude of the relationship between having a history of cancer and symptom clusters (from OR = 1.43 to 1.31), those with history of cancer were shown to have a greater risk for symptom clusters. Model 7 shows that having a history of cancer, being female, having a lower level of education, and more coexisting medical conditions confer greater risk for the occurrence of symptom clusters in this sample of community-dwelling middle to late-aged adults.

When we assessed any potential interaction between having a history of cancer and other covariates such as age groups (cancer by age interaction), the number of chronic diseases (cancer by chronic disease interaction), or type of insurance (cancer by insurance interaction), these interaction terms were not found to be significant.

Discussion

This is one of the first studies to specifically examine the prevalence of and factors associated with the multiple symptoms of community-dwelling adults with a history of cancer. We empirically demonstrated that community-dwelling adults with a history of cancer had higher prevalence of pain, depression, and fatigue compared to those without a history of cancer, after controlling for the influence of coexisting medical conditions, sociodemographic and access to care factors. Approximately, a third of respondents with a history of cancer reported being often troubled with pain, a quarter reported fatigue or severe exhaustion; and a fifth reported anxiety or depression.

Pain was found to be the most prevalent symptom for both cancer and noncancer groups. This is not surprising since pain is associated with a host of prevalent medical conditions, including arthritis and heart and lung diseases. Among cancer patients, it is estimated that approximately 55% of outpatients with metastatic cancer have disease-related pain.²¹ Despite national and international guidelines for its management, many patients with pain are not prescribed an analgesic appropriate to the severity of their pain.²¹⁻²³ Multicenter studies indicate that approximately 40% of patients with cancer pain are not prescribed analgesics potent enough to manage their pain, with additional patients not receiving sufficient dosing of the analgesic prescribed.^{21,23} The high prevalence for pain in both those with and without a history of cancer suggests that many individuals in the community are not receiving optimal pain treatment. Although we did not assess for current pain treatments, the fact that pain was described as often and troublesome implies possible undertreatment.

It should be noted that although pain was the most prevalent symptom, the magnitude of difference for the prevalence of symptoms between those with and without a history of cancer was highest for fatigue, with one in four of those with a history of cancer reporting fatigue in contrast to one in six for those without a history of cancer. This is not surprising; clinical studies of fatigue in cancer patients have shown that fatigue is prevalent in this population.^{24,25} Cancer and its treatment have been found to cause fatigue that can be devastating for many cancer patients, with multiple studies showing that the majority of patients undergoing chemotherapy or radiotherapy report significant fatigue during the course of treatment.^{1,26-29} In fact, depending on the type of cancer and the treatment received, studies have shown one third to almost half of patients may experience severe fatigue during their illness^{27,30,31} and that many cancer survivors experience significant fatigue. Studies^{32,33} comparing the prevalence of fatigue for patients vs. a community sample, also found that patients with cancer reported significantly more severe fatigue and fatiguerelated interference in their daily lives than the community-dwelling subjects.

Consistent with other studies, depression was found to be prevalent among those with a history of cancer.³⁴⁻³⁶ One in five of those with a history of cancer reported depression or anxiety. Studies among cancer patients have also found that many cancer patients experience depression at some point during their illness^{37,38} with prevalence of depression in cancer patients two to three times that found in the general population.³⁹ In this sample, we have shown that after controlling for the confounding effects of coexisting medical conditions and access to care and sociodemographic factors, those with a history of cancer remained at a greater risk for depression. Hewitt and Rowland,⁴⁰ in their study of a nationally representative sample of adults ($n = 95,615$), found that those with a history of cancer (cancer survivors) had significantly greater contact in the past year with a mental health provider (7.2% vs. 5.7%) compared to those without a history of cancer. They also found that cancer survivors were more likely to have used mental health services (odds ratio, 1.60 among those without other chronic illnesses and 3.04 among those with other chronic illnesses), and mental health service use was significantly greater among those who were under age 65 and diagnosed at younger ages, were

formerly married, or had other comorbid chronic conditions. These findings point to the need for early recognition of the mental health needs among those with cancer and potentially the greater demand for mental health services for many of the cancer survivors, especially those with coexisting medical conditions.

In creating mutually exclusive categories for symptom clusters, we determined that those with a history of cancer also have a greater burden for the co-occurrence or clustering of pain, depression, and fatigue, relative to those without a history of cancer. Although most studies assess symptoms individually, symptoms are almost never expressed in isolation. The occurrence of two or more symptoms (symptom clusters) is commonly observed in cancer patients.^{4,18,41} We focus on the co-occurrence of pain, depression and fatigue since these symptoms are the most prevalent among those with cancer. In this sample of community-dwelling adults with a history of cancer, the greater risk for these symptoms was found to persist even as when we take into account the impact of coexisting medical conditions, access to care, and sociodemographic factors. A number of studies have begun to explore the inter-relationships of symptoms,^{8,42,43} e.g., the possible role of depression in many cancer-related symptoms such as fatigue,^{44,45} or the role of pain on depression.^{46,47} Among community-dwelling adults, studies have shown that depression/mood modifies the relationship between pain and fatigue.⁴⁸ Among the implications of these findings is the need for additional studies to assess the extent to which these symptoms may have common underlying etiologies and potential treatment/interventions not just for individual symptoms but also for clusters of symptoms.

Our study also explored the role of coexisting medical conditions in the occurrence of symptom clusters. We found a positive association between symptom clusters and coexisting medical conditions, with increasing risk for symptom clusters observed with increasing fact, those with three or more coexisting medical conditions were found to have nine times the risk for symptom clusters relative to those without any coexisting medical conditions. This is an important finding. Patients from older age groups typically present with existing physiologic decline and coexisting medical conditions when diagnosed with cancer; thus, symptom management can be a considerable challenge.^{43,47,49} In fact, we have found that a higher proportion of those with a history of cancer have more coexisting medical conditions, suggesting that the burden of illness overall is greater for those with cancer. Yabroff et al.⁵⁰ found in a large national sample of adults that the burden of illness is greater for those with cancer relative to sex- and age-matched control subjects. However, this study and the study of Yabroff et al. used existing cross-sectional data, and the findings of excess burden for those with cancer cannot be directly attributed to cancer diagnosis and treatment. Prospective studies using measures of lost productivity, perceived health, and health utility in assessing the burden of illness among cancer survivors should be undertaken to obtain better estimates of the overall burden of cancer in the United States.

We also observed that factors such as gender, insurance status, and educational level were important risk factors for symptoms. Among the implications of these findings is the importance of these factors in designing targeted symptom management programs for these population subgroups in general, and especially for those with cancer.

There were limitations to this study. Using a one-item question to measure pain and fatigue may have resulted in an inadequate representation of the construct of pain and fatigue. However, studies have found that individual ratings of symptoms (such as pain) have shown minimal difference compared to composite measures.^{51,52}

Further, the influence of other factors that may modify the risk for pain, depression, and fatigue among those with a history of cancer was not assessed in the study. For example, we do not

have data on the type of cancer, date of diagnosis, severity of any of the diseases, symptom treatments. The nature of the existing HRS data set limited our ability to further explore these potential underlying reasons for the relationship between cancer and symptoms.

Notwithstanding the limitations of this study, our findings provide evidence that pain, depression, and fatigue, alone or as clusters, are prevalent among many community-dwelling middle-aged to late-aged adults, with those with a history of cancer having a disproportionate burden for these symptoms. Studies in the last decade have provided evidence that symptoms such as pain, depression, and fatigue are prevalent in cancer patients and that many cancer survivors continue to experience physical, affective, or cognitive symptoms even when their disease is in remission or treatment has ended. In this study we have shown that many of these symptoms persist in the community. The extent to which these symptoms remain uncontrolled sends a strong signal to health care providers of the need for continued monitoring, surveillance, and management of symptoms among cancer patients in the community. Future studies should also incorporate assessment of long-term burden of cancer and its treatment.

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Table 1

Profile of Study Population^a

Characteristics	With a History of Cancer, 12.5% (n = 2,161)	Without a History of Cancer, 87.5% (n = 15,049)	P Value
Age			0.0001
51–64	32.6 (699)	48.4 (7221)	
65–74	34.7 (743)	30.2 (4501)	
75–84	26.1 (559)	16.7 (2490)	
≥85	6.5 (140)	4.8 (709)	
Gender			0.609
Males	52.4 (1108)	51.8 (7634)	
Females	47.6 (1005)	48.2 (7098)	
Race/ethnicity			0.0001
Non-Hispanic White	84.2 (1848)	76.6 (11,484)	
Non-Hispanic Black	10.0 (214)	13.8 (2074)	
Hispanic	5.8 (125)	9.6 (1440)	
Education			0.016
0	0.7 (15)	0.7 (131)	
1–11th grade	26 (56)	29.2 (4387)	
12th grade	34 (733)	33.8 (5072)	
Some college	18.3 (422)	18.3 (2750)	
College graduate	9.8 (212)	8.5 (1283)	
Postcollege	10 (215)	9.2 (1387)	
Insurance status			0.0001
Medicare/other	85.6 (1848)	81.7 (12264)	
Medicaid	7.7 (166)	8.1 (1212)	
No insurance	6.8 (146)	10.2 (1536)	
Coexisting medical condition			0.0001
Hypertension	55.4 (1172)	51.0 (7569)	<0.001
Diabetes	16.9 (364)	15.8 (2371)	0.102
Lung disease	12.8 (274)	9.2 (1364)	<0.001
Heart disease	29.8 (638)	22.7 (3391)	<0.001
Stroke	9.0 (191)	6.9 (1030)	<0.001
Arthritis	67.8 (1442)	58.8 (8690)	<0.001
Number of coexisting medical conditions			0.0001
None	12.1 (242)	18.6 (2623)	
1	28.2 (565)	31.2 (4399)	
2	31.5 (632)	27.9 (3944)	
3	17.9 (358)	14.9 (2108)	
4	7.4 (148)	5.7 (803)	
5	2.7 (54)	1.6 (224)	
6	0.2 (5)	0.1 (18)	

^aHRS, Data 2000.

Table 2
Prevalence of Pain, Depression, and Fatigue ($n = 17,210$)^a

Symptoms	With a History of Cancer, % ($n = 2,161$)	Without a History of Cancer, % ($n = 15,049$)	<i>P</i> Value
Pain ^b	33 (712)	29 (4323)	0.0001
Depression ^b	21 (409)	18 (2374)	0.0001
Fatigue ^b	25 (545)	18 (2685)	0.0001

^aHRS, Data 2000.

^bNot mutually exclusive categories.

Table 3
Prevalence of Pain, Depression, and Fatigue by Selected Comorbid Conditions ($n=17,210$)^a

Comorbid Conditions	Pain		Depression		Fatigue	
	Without Cancer % (n)	With Cancer % (n)	Without Cancer % (n)	With Cancer % (n)	Without Cancer % (n)	With Cancer % (n)
Hypertension						
No	23.4 (1700)	30.1 (284)	13.4 (879)	16.9 (145)	13.7 (996)	22.9 (216)
Yes	33.8 (2553)	35.0 (410)	21.6 (1456)	24.5 (257)	21.8 (1651)	27.2 (318)
Diabetes						
No	26.9 (3383)	31.1 (554)	15.9 (1806)	19.5 (313)	15.9 (2005)	24.1 (430)
Yes	38.2 (906)	42.4 (154)	26.6 (555)	28.7 (94)	27.8 (659)	30.9 (112)
Lung disease						
No	27.0 (3656)	30.0 (559)	16.0 (1949)	18.6 (314)	15.7 (2128)	22.2 (414)
Yes	44.3 (603)	51.8 (142)	32.9 (392)	36.1 (86)	37.5 (511)	44.5 (122)
Heart disease						
No	25.7 (2953)	28.0 (421)	14.9 (1557)	18.2 (252)	14.0 (1612)	19.6 (294)
Yes	38.9 (1317)	44.5 (284)	26.7 (783)	28.3 (156)	30.6 (1035)	38.4 (245)
Stroke						
No	27.8 (3855)	31.6 (613)	16.5 (2094)	19.8 (352)	16.5 (2295)	23.6 (457)
Yes	39.7 (407)	43.7 (83)	32.4 (254)	33.6 (48)	33.5 (344)	40.7 (77)
Arthritis						
No	12.4 (755)	15.5 (106)	10.3 (568)	16.0 (101)	9.7 (592)	17.1 (117)
Yes	40.5 (3516)	41.5 (598)	22.6 (1764)	23.5 (301)	23.6 (2052)	29.3 (422)

^aHRS, Data 2000.

Table 4

Odds Ratios for Pain, Depression, and Fatigue in Community-Dwelling Adults With a History of Cancer Relative to Those Without a History of Cancer

Symptoms	P Value	Odds Ratio	95% C.I.	
			Upper C.I.	Lower C.I.
Pain	0.01	1.15	1.03	1.28
Depression	0.005	1.21	1.06	1.37
Fatigue	0.0001	1.45	1.29	1.63

HRS, Data 2000.

Note: All analyses were adjusted for age, gender, race, educational level, insurance status and coexisting medical conditions.

Separate analyses for each symptom.

Table 5

Prevalence of Symptom Clusters

Cluster	With Cancer, 12.6% (1,947)	Without Cancer, 87.4% (13,530)	P Value
Pain and fatigue	5.9 (115)	4.2 (564)	<0.001
Pain and depression	3.9 (75)	4.2 (565)	0.502
Fatigue and depression	3.5 (68)	2.2 (304)	0.001
Pain and fatigue and Depression	7.8 (151)	5.7 (765)	<0.001

HRS, Data 2000.

Mutually exclusive categories; those with pain only, depression only, fatigue only were removed from this analysis.

Table 6

Predictors of Symptom Clusters (Two or More Symptoms) (*n* = 14,025)

Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
History of cancer:							
No	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Yes	1.37 ^a	1.339 ^a	1.356 ^a	1.385 ^a	1.431 ^a	1.431 ^a	1.313 ^a
Age:							
51–64	1.0	1.0	1.0	1.0	1.0	1.0	1.0
65–74		.890 ^c	.867 ^b	.882 ^c	.821 ^a	.823 ^a	.682
75–84		1.254 ^a	1.235 ^a	1.264 ^a	1.118	1.113	.827
≥85		1.655 ^a	1.511 ^a	1.544 ^a	1.289 ^c	1.249 ^c	1.031
Gender:							
Male	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Female			1.437 ^a	1.432 ^a	1.366 ^a	1.28 ^a	1.273 ^a
Race:							
Non-Hispanic White	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Non-Hispanic Black			1.212 ^b	1.212 ^b	.982		
Hispanic			1.502 ^a	1.502 ^a	1.09		
Education:							
Postgraduate					1.0	1.0	1.0
None					7.100 ^a	5.400 ^a	4.121 ^a
1–11th					3.226 ^a	2.786 ^a	2.070 ^a
High school graduate					2.019 ^a	1.964 ^a	1.671 ^a
Some college					1.621 ^a	1.587 ^a	1.387 ^b
College graduate					1.155	1.128	1.085
Insurance status:							
Medicare/other insurance					1.0	1.0	1.0
Medicaid					2.296 ^a	2.296 ^a	1.840 ^a
No insurance					1.105	1.105	1.258 ^b
None							1.0
Number of coexisting medical conditions							
1							2.432 ^a
2							4.796 ^a
≥3							9.985 ^a

HRS, Data 2000.

^a *P* < 0.0001.

^b *P* < 0.001.

^c *P* < 0.05.