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Depression Treatment Among Elderly Medicare Beneficiaries With Incident Cases of Cancer and Newly Diagnosed Depression

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Abstract

Objective—Depression treatment can improve the health outcomes of elderly cancer survivors. There is a paucity of studies on the extent to which depression is treated among elderly cancer survivors. Therefore, this study estimated the rates of depression treatment among elderly cancer survivors and identified the factors affecting depression treatment.

Methods—A retrospective cohort study design was adopted, and data were obtained from the linked Surveillance, Epidemiology and End Results (SEER) and Medicare database. Elderly individuals (≥ 66 years) with incident cases of breast, colorectal, or prostate cancer and newly diagnosed depression (N=1, 673) were followed for six months after the depression diagnosis to identify depression treatment (antidepressants only, psychotherapy only, combined treatment with both antidepressants and psychotherapy, and no depression treatment). Chi-square tests and multinomial logistic regressions were used to analyze the factors associated with depression treatment.

Results—In this study population, 46% received antidepressants only, 27% received no treatment, 18% received combined therapy, and 9% received psychotherapy only. Factors associated with depression treatment included anxiety, the percentage of psychologists at the

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county level, the number of visits to primary care physicians, ongoing cancer treatment, the presence of other chronic conditions, and raceethnicity.

Conclusions—The study findings indicate that two-thirds of cancer survivors received depression treatment in the first six months after depression diagnosis. Our study findings indicate that racial-ethnic disparities in depression treatment persist and competing demands for cancer treatment may take priority over depression care. Also, the availability of psychologistsmay influence receipt of psychotherapy among cancer survivors.

Depression is a treatable and highly prevalent mental health condition among cancer survivors (1,2). Relief from clinical depression can be achieved with either pharmacotherapy or psychotherapy or a combination of pharmacotherapy and psychotherapy (3). Pharmacotherapy typically consists of antidepressants, such as selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), tricyclic antidepressants (TCAs), monoamine oxidase inhibitors (MAOIs), and others (for example, mirtazapine and bupropion) (3). Various forms of psychotherapy are used to treat depression, including cognitive-behavioral therapy and problem-solving therapy (3). Clinical practice guidelines have recommended depression treatment for cancer patients (4–6). These guidelines do not recommend the use of antidepressants over the use of psychotherapy alone or in combination with antidepressants, nor do they recommend one antidepressant over another.

Although depression treatment is recommended to reduce depressive symptoms among cancer survivors, it is not known how depression is treated among elderly persons with cancer in real-world clinical practice settings. Research on treatment of newly diagnosed depression among cancer survivors has not received much attention. In the United States, only two cross-sectional studies examined depression treatment among cancer survivors who sought health care in real-world, clinical practice settings (7,8). Of these two studies, one focused on elderly (age ≥65 years) Medicare beneficiaries with cancer by using data from 2000 to 2005 (7), and another used Medical Expenditures Panel Survey data from multiple years (2006–2008) for adults with both cancer and depression (8). Findings from these studies revealed that an estimated 76% and 84% of elderly cancer survivors, respectively, received any depression treatment. These studies involved cancer survivors with prevalent cases of depression and any type of cancer. These studies did not include cancer-related clinical factors, such as the stage of disease at cancer diagnosis and cancer treatment, which might affect depression treatment. Furthermore, these studies used self-reported data on either antidepressant use or depression diagnosis.

Therefore, the primary objective of this study was to fill the knowledge gap in estimating depression treatment and the factors associated with depression treatment among survivors of breast, colorectal, or prostate cancer with newly diagnosed depression. This study used a retrospective cohort design and data from clinical care encounters and prescription drug claims to analyze depression treatment among cancer survivors with newly diagnosed depression. These cancers were selected because of their high prevalence; they are projected to be the most common types of cancer by 2024.

CONCEPTUAL FRAMEWORK

The expanded behavioral model of health care utilization, the Andersen Behavioral Model, was used to guide the selection of factors that may affect depression treatment (9). According to the model, health services utilization—in this case, depression treatment—is a function of predisposing factors (an individual's predisposition to utilize the services), enabling factors (factors that enable individuals to use health care services), need factors (an individual's level of need), personal health practices, and the external environment.

METHODS

Study Design

This study utilized a retrospective cohort study design with baseline and follow-up periods. We considered the first observed date of depression diagnosis after cancer diagnosis as an index date. The baseline period was defined as 12 months before the index date, and the follow-up period was defined as six months after the index date. The study was approved by the West Virginia University Institutional Review Board.

Data Sources

The current study linked data from the Surveillance, Epidemiology and End Results (SEER)–Medicare linked files and the Area Health Resource File (AHRF). The SEER program collects data on all incident cases of cancer among persons residing in 18 SEER regions (10). These data are available in the Patient Entitlement and Diagnosis Summary File (PEDSF). This file has information on patients' demographic characteristics and cancer-related information, such as tumor stage and chemotherapy and radiation therapy provided within four months of cancer diagnosis.

SEER data have been linked to Medicare claims files. Medicare claims files consist of inpatient, outpatient, and prescription drug files. The inpatient file, the Medicare Provider Analysis and Review, provides data from Medicare Part A claims from inpatient hospitalizations and skilled nursing facilities. The outpatient files, the National Claims History files and outpatient claims files, contain data from Medicare Part B claims from institutional and noninstitutional providers. Medicare's prescription drug file provides data on prescription drug claims for Medicare beneficiaries who are enrolled in Medicare Part D plans.

The AHRF is a publicly available data file provided by the Department of Health and Human Services (11). The AHRF contains county-level information on health facilities, health professions, and socioeconomic and environmental characteristics. We linked the AHRF files to PEDSF files by geographic codes for state and county to derive the percentage of psychologists per county.

Study Population

Identification of cancer survivors—The study population was composed of elderly cancer survivors (age ≥66 years) who were diagnosed as having incident cases of primary breast, colorectal, or prostate cancer and newly diagnosed depression between 2007 and

2011. Cancer type (breast, colorectal, or prostate) was identified by using the histology codes and primary site variable from the *International Classification of Diseases for Oncology, Third Edition*.

Cancer survivors with newly diagnosed depression—We identified cancer survivors with newly diagnosed depression on the basis of the National Committee on Quality Assurance criteria (12). To do so, we first established a depression-free cancer cohort made up of patients who received the incident diagnosis of cancer between April 2007 and December 2011. To identify patients who were newly diagnosed with depression after receiving a cancer diagnosis, we included only patients who were diagnosed as having depression after receiving a cancer diagnosis and who did not have any antidepressant use in the 90 days prior to receiving a depression diagnosis. We used a validated algorithm developed by the Centers for Medicare and Medicaid Services (CMS) Chronic Conditions Data Warehouse (CCW) to identify depression (13) by using *ICD-9-CM* codes 296.2, 296.3, 298.0, 300.4, 309.1, and 311.0. These codes are widely used in the literature to identify depression diagnoses among Medicare beneficiaries (1,7,14).

Inclusion and exclusion criteria—We included only individuals with incident cases of primary cancer and only if the cancer stage at diagnosis was known, if the diagnosis was not identified by autopsy or by death certificate, and if the individual was alive during the follow-up period and was 66 years old or older at the time of cancer diagnosis (N=217, 528). Because the focus of the study was depression treatment, we restricted our study population to individuals who had been diagnosed as having depression between 2007 and 2011 (N=18, 347). Of these individuals, 4,403 developed depression in the 12-month follow-up period after cancer diagnosis. We required that all individuals have continuous enrollment in Medicare Parts A and B during the observation period (beginning 12 months before and ending six months after the depression diagnosis) (N=3, 160). We also required continuous enrollment in Medicare Part D for six months after the diagnosis of depression so that we could identify depression treatment in the follow-up period (N=1, 889). We excluded individuals with bipolar disorder. The final study population consisted of 1,673 elderly Medicare beneficiaries with newly diagnosed depression and an incident case of breast, colorectal, or prostate cancer. [Details about the analytical process involved in population selection are available in an online supplement to this article.]

Dependent Variable: Depression Treatment

We identified depression treatment during the first six months after depression diagnosis. Antidepressant use was derived from Medicare Part D claims by using the National Drug Codes and generic names. Antidepressants included SSRIs, SNRIs, TCAs, MAOIs, and others (for example, mirtazapine and bupropion). Cancer survivors with at least one prescription for antidepressants were considered to have used antidepressants. Psychotherapy visits were derived from Medicare outpatient claims by using the Current Procedural Terminology codes. Cancer survivors with at least one psychotherapy visit were considered to have received psychotherapy.

On the basis of antidepressant prescriptions and psychotherapy visits, depression treatment was categorized into four mutually exclusive categories: antidepressants only (at least one prescription for antidepressants and no psychotherapy visits), psychotherapy only (at least one psychotherapy office visit and no prescriptions for antidepressants), both antidepressants and psychotherapy (at least one prescription for antidepressants and at least one psychotherapy visit), and no treatment (neither antidepressants nor psychotherapy).

Independent Variables

Predisposing factors included age in years at cancer diagnosis and race. Enabling factors consisted of marital status; number of visits to primary care physicians (PCPs); cancer type (women with breast cancer, women with colorectal cancer, men with colorectal cancer, and men with prostate cancer); stage at cancer diagnosis (categorized using American Joint Committee on Cancer grouped staging); and cancer treatment with chemotherapy, radiation therapy, radiation therapy, or surgery. Because cancer is often considered a dominant condition and cancer treatment after depression diagnosis may compete with depression care, we categorized cancer treatment into three groups: cancer treatment received before depression diagnosis; cancer treatment received at the time of or after depression diagnosis, and no cancer treatment.

Need factors comprised chronic conditions, which were selected on the basis of the framework of the multiple chronic conditions working group (15). The following chronic conditions were used: Alzheimer's disease and related disorders (ADRD), anxiety, cardiovascular conditions (diabetes, heart disease, hyperlipidemia, hypertension, and stroke), musculoskeletal conditions (arthritis and osteoporosis), and respiratory conditions (asthma and chronic obstructive pulmonary disorder. We identified these conditions on the basis of a validated algorithm developed by the CMS CCW (13); according to this algorithm, chronic conditions were identified if individuals had, at least, one inpatient visit or two outpatient visits during the baseline period. External environment factors included the county-level percentage of psychologists and the SEER region. We also controlled for year of cancer diagnosis by grouping the year of diagnosis into two groups: 2007–2009, the period when FDA issued a black box warning about the risk of suicides with antidepressant use (16,17), and 2010–2011, the period when published articles reported the association between antidepressants and the risk of new-onset diabetes (18).

Statistical Analysis

We used chi-square tests and multinomial logistic regressions to examine the unadjusted differences in independent variables by depression treatment categories. We used multivariable multinomial logistic regressions to examine the adjusted association between the independent variables and depression treatment categories. In all these models, the reference group for the dependent variable was no depression treatment. All statistical analyses were carried out in SAS, version 9.4.

RESULTS

The study population is described in Table 1 and Table 2. The study population consisted of 1,673 elderly fee-for-service Medicare beneficiaries with incident cases of breast, colorectal, or prostate cancer who had been newly diagnosed as having depression after receiving a cancer diagnosis. In this study population, 45% were women with breast cancer, 23% were women with colorectal cancer, 10% were men with colorectal cancer, and 22% were men with prostate cancer. We found that 35% were diagnosed as having early-stage cancers (stage 0 or I), 7% were diagnosed at an advanced stage (stage IV), 68% received cancer treatment before receiving a depression diagnosis, 21% received cancer treatment at the time of or after receiving a depression diagnosis, and 11% did not receive cancer treatment. A total of 27% did not receive any depression treatment, 46% received antidepressants only, 9% received psychotherapy only, and 18% received both antidepressants and psychotherapy.

Table 3 presents the significant adjusted odds ratios (AORs) and 95% confidence intervals from multinomial logistic regressions examining the likelihood of depression treatment in the study population. The results were consistent with the unadjusted analyses. We found significant associations between a predisposing factor (race) and use of antidepressants only. Compared with whites, African Americans were less likely to receive antidepressants than to receive no depression treatment (AOR=.44). We also found a significant association between psychotherapy use and enabling factors (marital status, PCP visits, and cancer treatment), need factors (ADRD, anxiety, and cardiovascular and respiratory conditions), and external environment (county-level percentage of psychologists and region of residence). For example, individuals with a higher number of PCP visits were more likely to use psychotherapy (AOR=1.02). With regard to combined use of antidepressants and psychotherapy, we found a significant association between combined use and a predisposing factor (race), two enabling factors (PCP visits and cancer treatment), a need factor (ADRD), and external environment (county-level percentage of psychologists and region of residence). Of particular interest was the cancer type (see online supplement). We observed that there were no significant differences in the likelihood of receiving depression treatment among patients with different types of cancer.

DISCUSSION

In this study, we estimated the rates of depression treatment among elderly cancer survivors with incident cases of breast, colorectal, or prostate cancer who had been newly diagnosed with depression and identified the factors associated with depression treatment. In our study population, one in four cancer survivors did not receive either antidepressants or psychotherapy for depression. This finding is consistent with the only published study of depression treatment rates among elderly Medicare beneficiaries with cancer (7).

We found that African Americans and members of other racial-ethnic minority groups were less likely than whites to receive antidepressants only rather than no treatment. Such racial disparities in use of antidepressants have been documented among elderly Medicare beneficiaries with cancer (7) as well as in the general population (19–21). Some studies have attributed the racial-ethnic disparities in antidepressant use to more negative views about the

acceptability of receiving antidepressants treatment (22), different preferences for treatment, and questions about the effectiveness of antidepressants treatment among patients from racial-ethnic minority groups (23).

Psychotherapy only or combined use of antidepressants and psychotherapy was associated with many factors. Cancer survivors with a higher number of PCP visits were more likely to receive psychotherapy and a combination of antidepressants and psychotherapy compared with those with a lower number of PCP visits. This finding suggests that PCPs may play an important role in referring cancer survivors to mental health care providers for psychotherapy treatment. A national survey of physicians conducted by the Cancer Care Outcomes Research and Surveillance Consortium has shown that PCPs are more involved than oncologists in the detection and treatment of depression among cancer survivors—50% of the PCPs surveyed were involved in detection and treatment of depression among cancer survivors compared with 18% of oncologists (24).

As expected, we found that persons who had initiated cancer treatment after receiving a depression diagnosis were less likely to receive psychotherapy compared with persons who had initiated cancer treatment before receiving a depression diagnosis. Because psychotherapy sessions involve face-to-face visits with a mental health provider, cancer survivors may not be able to receive psychotherapy while cancer treatment is ongoing. These findings provide some evidence to support the theory of competing demands for care, which suggests that cancer is a dominant condition and may “eclipse the management of other health conditions” (25). We also observed that use of psychotherapy and use of a combination of antidepressants and psychotherapy were significantly associated with a higher county-level percentage of psychologists, which is consistent with the published literature (26).

Furthermore, we found that many coexisting chronic conditions were associated with depression treatment among cancer patients. Cancer survivors with respiratory conditions were more likely than cancer survivors without those conditions to receive psychotherapy treatment. This is not surprising because psychotherapy is a standard part of the rehabilitation therapy regimen for treating respiratory conditions (27,28). This study also found that individuals with ADRD were more likely to receive psychotherapy and a combination of antidepressants and psychotherapy compared with those without ADRD. Cognitive therapy and other psychotherapies are some treatment modalities that are used to improve ADRD symptoms.

Furthermore, the preexisting cardiovascular conditions were negatively associated with psychotherapy treatment. The Canadian Cardiac Randomized Evaluation of Antidepressant and Psychotherapy Efficacy (CREATE) trial, a randomized clinical trial of depression treatment among adults with cardiovascular diseases, did not demonstrate the efficacy of psychotherapy in improving depression among patients with cardiovascular conditions (29). A Cochrane review of psychotherapy for patients with cardiovascular disease did not find strong evidence that psychotherapies improve cardiovascular outcomes (30). Therefore, we speculate that physicians may not recommend psychotherapy for cancer patients with

cardiovascular diseases because of a lack of robust evidence on cardiovascular-related outcomes.

This study has filled a knowledge gap by estimating the rates of various categories of depression treatment among individuals with newly diagnosed depression and incident cases of breast, colorectal, or prostate cancer and by identifying the factors associated with depression treatment. The study made unique contributions to the nascent literature on depression care among cancer survivors. It must be noted that neither type nor stage of cancer was associated with depression treatment once depression had been diagnosed, suggesting that detecting depression and diagnosing depression are critical to depression management among cancer survivors. Future research may need to investigate the impact of Part D coverage on depression treatment. Research in this area can inform policy efforts to achieve universal coverage for prescription drugs, regardless of a patient's ability to pay.

This study's findings must be interpreted in the context of its advantages and limitations. One advantage of the study was that it used linked cancer registry and claims data in which we were able to follow a large cohort of cancer survivors and to control for a comprehensive list of factors that may affect the rates of depression treatment. Another advantage was that we used Medicare Part D to identify antidepressant treatment rates. This study also had some limitations. Because the study population was restricted to fee-for-service Medicare beneficiaries who were residing in SEER regions and who had Medicare part D coverage, the study findings are not generalizable to all Medicare beneficiaries. Also, given that our study population was selected with very strict inclusion criteria and required continuous enrollment in Medicare Parts A, B, and D during the observation period, the number of beneficiaries with newly diagnosed depression in our study was lower than the number reported in other studies. Although other effective treatments for depression exist, such as electroconvulsive therapy, we focused on antidepressants, psychotherapy, and the combination of both because they are the most commonly used depression treatments. Furthermore, our definition of depression treatment may not represent adequate depression treatment. Although we captured many variables that may be associated with the rates of depression treatment, some important variables, such as patient preferences, were lacking. In addition, the reasons for not receiving depression treatment were not explored in this study.

CONCLUSIONS

Even when depression is successfully diagnosed in the oncology setting, a treatment gap exists. One-fourth of cancer survivors with newly diagnosed depression did not receive any depression treatment. Therefore, greater effort is needed to ensure that cancer survivors are receiving depression treatment, especially cancer survivors who initiated cancer treatment after receiving a depression diagnosis, given that competing demands for treatment can impede depression care. Depression care can be improved by reducing racial disparities, increasing contact among cancer survivors with primary care providers, and increasing the supply of mental health services.

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TABLE 1

Characteristics of 1,673 elderly fee-for-service Medicare beneficiaries who were newly diagnosed with depression after receipt of a diagnosis of breast, colorectal, or prostate cancer[a]

Variable	N	%
Predisposing factor		
Age		
66–69	434	26
70–74	430	26
75–79	342	20
≥80	467	28
Race-ethnicity		
White	1,393	83
African American	145	9
Other	135	8
Enabling factor		
Marital status		
Married	649	39
Never married	177	11
Separated, divorced, widowed, or unknown	847	51
Primary care visits (M ± SD)	10.18 ± 10.1	
Cancer type		
Breast	752	45
Colorectal, women	381	23
Colorectal, men	169	10
Prostate	371	22
Cancer stage		
0–I	586	35
II	720	43
III	249	15
IV	118	7
Cancer treatment		
Before depression diagnosis	1,137	68
After depression diagnosis	358	2
No treatment	178	11
Need factor		
Cardiovascular conditions		
Yes	1,469	88
No	204	12
Musculoskeletal conditions		
Yes	543	33
No	1,130	68
Respiratory conditions		

Variable	N	%
Yes	379	23
No	1,294	77
ADRD[b]		
Yes	219	13
No	1,454	87
Anxiety		
Yes	437	26
No	1,236	74
External environment		
County-level percentage of psychologists (M ± SD)	2.37 ± 4.2	
Region		
Northeast	323	19
South	457	27
North Central	212	13
West	681	41
Year of cancer diagnosis		
2007–2009	954	57
2010–2012	719	43

[a]Source: Surveillance, Epidemiology and End Results–Medicare Database, 2007–2012. Patients were continuously enrolled in Medicare Part A and B during the 12 months before the diagnosis of depression and were continuously enrolled in Medicare Parts A, B, and D for six months following the depression diagnosis. Patients who died during the 18-month observation period were excluded.

[b]Alzheimer's disease and related disorders

TABLE 2

Characteristics of 1,673 elderly fee-for-service Medicare beneficiaries who were newly diagnosed as having depression after receipt of a diagnosis of breast, colorectal, or prostate cancer, by depression treatment category[a]

Variable	Total N	Antidepressants only N	%	psychotherapy only N	%	Combined antidepressants and Psychotherapy N	%	No treatment N	%	χ^2	df
Total		764	46	148	9	308	18	453	27		
Predisposing factor											
Age										8.6	9
66–69	434	208	48	39	9	82	19	105	24		
70–74	430	199	46	36	8	71	17	124	29		
75–79	342	158	46	23	7	63	18	98	29		
≥80	467	199	43	50	11	92	20	126	27		
Race-ethnicity										38.8***	6
White	1,393	667	48	115	8	252	18	359	26		
African American	145	41	28	23	16	40	28	41	28		
Other	135	56	42	13	7	16	12	53	39		
Enabling factor											
Marital status										28.7***	6
Married	649	305	47	41	6	112	17	191	29		
Never married	177	64	36	26	15	49	28	38	22		
Separated, divorced, widowed, or unknown	847	395	47	81	10	147	17	224	26		
Primary care visits (M±SD)		9.2±9.1		13.1±13.8		12.3±11.8		9.41±8.6		***b	
Cancer type										12.4	9
Breast	752	369	49	58	8	130	17	195	26		
Colorectal, women	381	165	43	40	11	71	19	105	28		
Colorectal, men	169	67	40	22	13	31	18	49	29		
Prostate	371	163	44	28	8	76	21	104	28		
Cancer stage										4.9	12
0–I	586	276	47	50	9	106	18	154	26		

Variable	Total N	Antidepressants only N	%	psychotherapy only N	%	Combined antidepressants and Psychotherapy N	%	No treatment N	%	χ^2	df
II	720	321	45	59	8	137	19	203	28		
III	249	115	46	27	11	47	19	60	24		
IV	118	52	44	12	10	18	15	36	31		
Cancer treatment										36.4***	6
Before depression diagnosis	1,137	507	45	106	9	227	20	297	26		
After depression diagnosis	358	194	54	17	5	41	12	106	30		
No treatment	178	63	35	25	14	40	23	50	28		
Need factor											
Cardiovascular conditions										11.3*	3
Yes	1,469	691	47	127	9	292	20	359	24		
No	204	84	41	32	16	36	18	52	25		
Musculoskeletal conditions										5.9	3
Yes	543	243	45	48	9	121	22	131	24		
No	1,130	521	46	115	10	224	20	270	24		
Respiratory conditions										10.3*	3
Yes	379	174	46	47	12	79	21	79	21		
No	1,294	599	46	101	8	276	21	318	25		
ADRD[c]										55.7***	3
Yes	219	83	38	33	15	71	32	32	15		
No	1,454	681	47	115	8	237	16	421	29		
Anxiety										13.7**	3
Yes	437	205	47	25	6	99	23	108	25		
No	1,236	559	45	123	10	209	17	345	28		
External environment											
County-level percentage of psychologists (M±SD)		2.0±3.9		3.1±4.9		2.8±4.6		2.5±4.2		***[b]	
Region										59.3**	9
Northeast	323	121	38	43	13	89	28	70	22		
South	457	243	53	24	5	60	13	130	29		

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Variable	Total N	Antidepressants only N	%	psychotherapy only N	%	Combined antidepressants and Psychotherapy N	%	No treatment N	%	χ^2	df
North Central	212	92	43	23	11	49	23	48	23		
West	681	308	45	58	9	110	16	205	30		
Year of cancer diagnosis										19.4	3
2007–2009	954	445	47	87	9	167	18	255	27		
2010–2012	719	319	44	61	9	141	20	198	28		

[a] Source: Surveillance, Epidemiology and End Results–Medicare Database, 2007–2012. Patients were continuously enrolled in Medicare Part A and B during the 12 months before the diagnosis of depression and were continuously enrolled in Medicare Parts A, B, and D for six months following the depression diagnosis. Patients who died during the 18-month observation period were excluded.

[b] The three asterisks with no chi square was used to indicate significant differences in the mean of that variable among the depression treatment groups.

[c] Alzheimer's disease and related disorders

*** p<.001,

** .001≤p<.01,

* .01≤p<.05

TABLE 3

Adjusted odds of receipt of various categories of depression treatment versus no treatment among elderly fee-for-service Medicare beneficiaries who were newly diagnosed as having depression after receipt of a diagnosis of breast, colorectal, or prostate cancer[a]

	Antidepressants only		Psychotherapy only		Combined antidepressants and psychotherapy	
Variable	**AOR[b]**	**95% CI**	**AOR[b]**	**95% CI**	**AOR[b]**	**95% CI**
Predisposing factor						
Race-ethnicity (reference: white)						
African American	.44***	.27–.70	1.19	.64–2.21	1.02	.61–1.71
Other	.59*	.38–.92	.49	.22–1.06	.38**	.20–.71
Enabling factor						
Marital status (reference: married)						
Never married	1.14	.71–1.83	2.33*	1.21–4.48	1.68	.98–2.86
Separated, divorced, widowed, or unknown	1.15	.87–1.51	1.57	.98–2.50	1.02	.71–1.45
Primary care visits	1.00	.99–1.02	1.02*	1.00–1.04	1.02*	1.00–1.04
Cancer treatment (reference: before depression diagnosis)						
After depression diagnosis	.95	.70–1.27	.40**	.22–.72	.51**	.34–.79
No treatment	.83	.53–1.28	1.31	.72–2.40	.90	.54–1.51
Need factor						
Cardiovascular conditions (reference: no)	1.04	.68–1.61	.39*	.21–.74	1.41	.75–2.68
Respiratory conditions (reference: no)	1.22	.90–1.67	1.64*	1.04–2.58	1.20	.82–1.75
ADRD (reference: no)[c]	1.53	.98–2.40	2.58**	1.44–4.61	2.94***	1.81–4.76
Anxiety (reference: no)	.94	.71–1.24	.48**	.29–.80	1.17	.82–1.66
External environment						
County-level percentage of psychologists (M±SD)	.99	.96–1.02	1.05*	1.00–1.11	1.05*	1.00–1.09
Region (reference: West)						
Northeast	.99	.67–1.46	2.53**	1.42–4.52	2.48***	1.56–3.95
South	1.07	.77–1.51	.74	.39–1.39	.84	.52–1.34

Variable	Antidepressants only		Psychotherapy only		Combined antidepressants and psychotherapy	
	AOR[b]	95% CI	AOR[b]	95% CI	AOR[b]	95% CI
North Central	1.27	.81–1.99	2.27*	1.15–4.51	2.18**	1.26–3.77

[a] Patients were continuously enrolled in Medicare Part A and B during the 12 months before the diagnosis of depression and were continuously enrolled in Medicare Parts A, B, and D for six months following the depression diagnosis. Patients who died during the 18-month observation period were excluded. Results are based on multinomial logistic regression.

[b] Adjusted odds ratio

[c] ADRD, Alzheimer's disease and related disorders

*** p<.001;

** .001≤p<.01;

* .01≤p<.05