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Mental health services utilization and expenditures associated with cancer survivorship in the United States

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Abstract

Purpose—The aim of this study is to assess mental health services utilization and expenditures associated with cancer history using a nationally representative sample in the US.

Methods—We used data from the 2008–2011 Medical Expenditure Panel Survey and multivariate regression models to assess mental health services use and expenditures among cancer survivors compared to individuals without a cancer history, stratified by age (18–64 and 65 years) and time since diagnosis (≤1 vs. >1 year).

Results—Among adults aged 18–64, compared with individuals without a cancer history, cancer survivors were more likely to screen positive for current psychological distress and depression regardless of time since diagnosis; survivors diagnosed >1 year ago were more likely to use mental health prescription drugs; those diagnosed within 1 year reported significantly lower annual per capita mental health drug expenditure and out-of-pocket mental health expenditure, while those diagnosed >1 year presented significantly higher annual per capita mental health

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expenditure. No significant differences in mental health expenditures were found among adults aged 65 or older.

Conclusions—Mental health problems presented higher health and economic burden among younger and longer-term survivors than individuals without a cancer history. This study provides data for monitoring the impact of initiatives to enhance coverage and access for mental health services at the national level.

Implications for cancer survivors—Early detection and appropriate treatment of mental health problems may help improve quality of cancer survivorship.

Keywords

Cancer; Mental health; Utilization; Expenditures; Prescription drug

Introduction

Addressing mental health needs of cancer survivors is important for optimizing quality of life and adaptation after cancer [1]. Psychological distress and depressive symptoms in cancer survivors are adversely associated with quality of life [2, 3], health behaviors [4], adherence to medical treatments [1], healthcare costs [5], and cancer progression and survival [6–8]. Although prevalence estimates vary by cancer site, time since diagnosis [9], and the way that mental health conditions are defined, approximately one third of cancer survivors have a mental health diagnosis [10–12].

The number of cancer survivors in the United States has grown to 13.7 million according to 2013 estimates, with approximately 64 % diagnosed 5 years ago [13]. This population will continue to grow as the population ages and with improvements in cancer screening, early detection, and treatment [14]. Thus, the demand for mental health services among cancer survivors is expected to increase given both the growing number of survivors and the increased demand for mental health services observed in the general population over the past 25 years [15, 16]. Efficacious and cost-effective treatments for psychological comorbidities in cancer survivors have been developed [17–19]. Several studies have found that cancer survivors are more likely to use mental health services than persons without a cancer history [11, 20, 21]. However, very limited research examined the utilization and expenditure among cancer survivors compared to those without a cancer history stratified by age and time since diagnosis. In addition, mental health services expenditure among cancer survivors have not been assessed at the national level nor have previous studies simultaneously considered mental health visits use and prescription drugs use, the latter of which accounts for a substantial and growing proportion of mental health services [22].

Given the projected shortage of the specialized medical workforce available to treat cancer survivors [23] and concerns about rising healthcare costs [24], it is important to quantify mental health services use and expenditures among cancer survivors, as well as survivors' direct economic burden (out-of-pocket expenditures). In this study, we estimated (1) mental health needs and services use, including mental health-related prescriptions, among adult cancer survivors and individuals without a cancer history using a nationally representative

sample and (2) excess annual per capita and out-of-pocket mental health services expenditures among cancer survivors. This study provides data for understanding cancer survivors' needs and use patterns of mental health services by age and time since diagnosis. These data are essential for monitoring the impact of initiatives to enhance coverage and access for mental health services at the national level.

Methods

Data source and study sample

This study included individuals who were 18 years or older and participated in the Medical Expenditure Panel Survey (MEPS) for 2008–2011 (http://meps.ahrq.gov/mepsweb/survey_comp/household.jsp). The MEPS is an ongoing household survey developed to collect information on healthcare use and expenditures through in-person interviews using computer-assisted personal interview (CAPI). Data collection is initiated with a new sample (i.e., “panel”) each year that participates in MEPS for 2 years. MEPS data have been widely used to generate nationally representative estimates of healthcare use and expenditures for the civilian noninstitutionalized population in the US [16, 22, 25].

Cancer survivors were identified from a survey question which asked if a participant has ever been told by a doctor or other health professional that he/she had cancer or any other malignancy. Individuals who reported only nonmelanoma skin cancers were excluded from the study sample because the diagnosis and treatment of these malignancies are generally considered to be minor [26] and they are routinely excluded from other studies of cancer survivors [27–29]. Those with missing time since diagnosis were also excluded from this study ($n=262$) including those who reported age at diagnosis beyond the usual age range for diagnosis of each cancer [27]. In addition, we restricted the sample to those who were in the scope for the whole year to capture full-year utilization and expenditure. The current analytic sample consisted of 5,944 adult cancer survivors and 76,877 adults without a cancer history at the time of survey, representing 19.2 and 197.3 million people annually and nationally, respectively.

Measures

Sociodemographics, comorbidities, and time since cancer diagnosis—

Sociodemographic characteristics included age by the end of survey year, sex, race/ethnicity, education, marital status, annual household income as a percentage of the federal poverty level (% FPL), health insurance coverage, having a usual source of care, smoking status (current smoker vs. nonsmoker), and body mass index (BMI; kg/m^2).

Comorbidities were measured using the number of known MEPS priority conditions other than cancer (categorized as 0, 1, 2, 3, or 4+ priority conditions), which include high blood pressure, heart disease, stroke, emphysema, chronic bronchitis, high cholesterol, diabetes, joint pain, arthritis, and asthma.

Years since cancer diagnosis were calculated by subtracting survivors' age at most recent cancer diagnosis from their current age. Time since diagnosis was categorized into 1 year

and >1 year, given that most expenditure for cancer treatment and psychosocial impact of cancer diagnosis occurred within the first year after diagnosis [25, 30, 31].

Current mental health needs

Screeners for psychological distress or depression included the Patient Health Questionnaire-2 (PHQ-2) and the Kessler 6. A positive screener for the PHQ-2 is a score of >2 [32], and a score of >12 for the Kessler 6 [33].

Mental health services use

Similar to previous publications which defined mental health conditions using the MEPS data [22], we defined mental health conditions by Clinical Classification Codes (CCC) 650-1, 656-62, and 670, which include mood disorders, anxiety disorders, psychotic disorders, substance use disorders, and sleep disorders. Attention-deficit disorder, developmental disorders, other disorders diagnosed in infancy, childhood, or adolescence, as well as delirium, dementia, and other cognitive disorders were not included as mental health conditions.

Mental health services use was defined (yes/no) by whether an individual reported any mental health visits (office-based, out-patient, emergency room, or hospitalization visit) or prescription drugs use [22]. Mental health visits were abstracted from the inpatient, outpatient, office-based provider, or emergency room event files. A visit was considered to be related to mental health if any of the following were true: (1) reported as related to a mental health condition(s); (2) a psychiatrist, psychologist, or social worker was seen; (3) drug or alcohol treatment was received; or (4) psychotherapy or counseling was provided during the visit [ICD 9 procedure code 94]. The annual total number of mental health visits was summed for each participant.

Prescriptions were defined as for mental health if two criteria were met: (1) reported to be associated with a mental health condition (designated using CCCs) and (2) fell into one of several designated therapeutic classes, including antidepressants, antianxiety drugs (including beta blockers), antimanics/anticonvulsants, antipsychotics, sedatives/hypnotics, and drugs used for substance abuse [22]. Information on over-the-counter drugs is not available in MEPS and was not included in the estimates.

Mental health expenditures

Expenditures for mental health visits, mental health prescription drugs use, and total mental health expenditure (visits and prescriptions) were calculated by summing the out-of-pocket expenditure and third-party payments for inpatient, outpatient, office-based provider and emergency room visits, and prescription drugs.

Statistical analysis

First, sociodemographics and comorbidities among cancer survivors and individuals without a cancer history were compared using adjusted Wald tests for continuous variables and Rao-Scott chi-square tests for categorical variables. Second, current mental health needs and mental health services use by cancer history were assessed using multivariate logistic

regression models. Third, per capita annual and out-of-pocket mental health expenditures associated with cancer history were analyzed by comparing expenditures among cancer survivors with individuals without a cancer history using a weighted two-part model to account for the significant number of nonusers of mental health services. The first part of the model estimates a logistic regression to predict any mental health services use. Generalized linear models with a gamma distribution and a log link function were used in the second part among users of mental health services to account for the highly skewed nature of medical spending [34, 35]. The predicted margin of per capita mental health expenditures and its 95 % confidence interval by cancer history were estimated. Cancer survivors were further stratified by time since diagnosis (≤ 1 vs. >1 year). The method of predicted margins directly standardizes the outcome of each group to the covariate distribution of the population [36]. All expenditures were inflated to 2011 dollars using Personal Health Care Expenditure (PHCE) component of the National Health Expenditure Accounts (http://meps.ahrq.gov/about_meps/Price_Index.shtml). Separate analyses were conducted by age group (18–64 and >65 years) to account for differences in insurance coverage, comorbidities, and psychosocial needs across these groups. Analyses were conducted using Stata 12 and accounted for complex survey design.

Results

Population characteristics

In both age strata (18–64 and ≥ 65 years), cancer survivors were more likely to be older, non-Hispanic white, and to report some college or more education, a usual source of care, and more comorbidities than individuals without a cancer history (all $p < 0.01$; Table 1). Among adults aged 18–64 years, cancer survivors were more likely to have public insurance only and less likely to be low-income or uninsured than individuals without a cancer history (all $p < 0.01$). Among adults aged 65 or older, cancer survivors were more likely to have any private insurance than individuals without a cancer history ($p < 0.001$). Among cancer survivors in this study sample, 86.3 % had been diagnosed >1 year ago. The top three most common cancer sites reported were breast (18.0 %), prostate (13.8 %), and melanoma (9.0 %) (data not shown).

Mental health needs and use

Among adults aged 18–64, cancer survivors were more likely to screen positive for current psychological distress and depression than individuals without a cancer history regardless of time since diagnosis ($p < 0.05$), in adjusted analysis (Table 2). Among adults aged 65 or older, cancer survivors diagnosed >1 year ago were more likely to screen positive for depression ($p < 0.01$) than individuals without a cancer history.

Among adults aged 18–64, cancer survivors diagnosed >1 year ago were more likely to use mental health prescription drugs (14.6 vs. 11.5 %, $p < 0.01$), while those diagnosed ≤ 1 year were less likely to use mental health prescription drugs (8.7 vs. 11.5 %, $p < 0.05$) than individuals without a cancer history. Among those aged 65 or older, cancer survivors diagnosed >1 year ago were more likely to use mental health prescription drugs than individuals without a cancer history (16.4 vs. 13.6 %, $p < 0.05$), while no significant

differences were found in newly diagnosed older adults. No significant differences in mental health visits use was found in either age strata.

Mental health expenditures

Among adults aged 18–64, cancer survivors diagnosed ≤ 1 year reported significantly lower out-of-pocket mental health expenditure (\$18 vs. \$41, $p < 0.01$) and per capita annual mental health drug expenditure (\$51 vs. \$103, $p < 0.01$) than individuals without a cancer history, in adjusted analysis (Table 3). Among survivors aged 18–64 and diagnosed > 1 year ago, annual per capita mental health expenditure were about 45 % higher than individuals without a cancer history (\$304 vs. \$210, $p < 0.05$) with no significant differences in the other three types of expenditure, in adjusted analysis.

Among those aged 65 or older, no significant difference in mental health expenditures was found between cancer survivors and individuals without a cancer history.

Discussion

Using a nationally representative sample from the 2008–2011 MEPS, we evaluated mental health services use and expenditures associated with cancer history in the USA. Mental health problems presented a significant health and economic burden among cancer survivors compared to individuals without a cancer history, especially among those aged 18–64 years and diagnosed more than 1 year ago. To the authors' best knowledge, this is the first study to quantify the use and expenditures of both mental health visits and prescription drugs associated with cancer history at the national level, stratified by age and time since diagnosis. Given the substantial prevalence and impact of mental health problems among a growing population of cancer survivors, this study provides important information for comprehensive estimation of psychosocial burden associated with cancer history.

Our results emphasized the importance of stratification by age and time since diagnosis in assessing mental health needs and services use among cancer survivors, which has been overlooked in most previous studies [11, 20]. Younger adult survivors may experience more psychosocial events due to cancer diagnosis (such as change in employment status) [28, 31]. Elderly cancer survivors may underreport mental health problems associated with cancer diagnosis by taking those symptoms as part of normal aging process. Most cancer patients received intensive treatment for cancer and experienced psychosocial events related to cancer (e.g., early retirement or job loss) within the first year after their diagnosis [28, 30], treatment-related stress, and their mental health outcome may be more likely to show up after the first year.

Consistent with earlier studies of mental health services use [11, 20], cancer survivors were more likely to report mental health services use, especially among those longer-term survivors (diagnosed > 1 year). As others have suggested, a higher likelihood of mental health services use among survivors may reflect the lasting psychological effects of cancer [21]. Survivors may have more frequent interaction with healthcare providers and therefore may experience more opportunities for detection of and referral for mental health concerns. However, because survivors reported higher mental health services use independent of

insurance status and having a usual source of care, other factors beyond connection to the healthcare system may have also played a role. Higher mental health services use may also suggest better access to care. Although cancer survivors aged 18–64 reported significantly higher mental health needs regardless of time since diagnosis, the mental health prescription drugs use and expenditure were significantly lower among those diagnosed 1 year than individuals without a cancer history. This may suggest higher unmet mental health needs among recently diagnosed younger adult cancer survivors. Punekar et al. [21] found significant higher mental health prescription drugs use among younger adult cancer survivors compared to individuals without a cancer history. Our results suggested that mental health services use varied by time since diagnosis.

Several limitations of this study need to be acknowledged. First, MEPS may underestimate population-based estimates of mental health services use and expenditures because participants self-report mental health events and conditions (recall bias and/or stigma). In addition, MEPS respondents are community (noninstitutionalized) residents and mental health problems may be more severe among institutionalized population which was excluded from MEPS sample. Second, this study is cross-sectional; a causal relationship between cancer history and mental health use cannot be inferred. Additionally, inferences about the appropriateness of mental health services received cannot be made in this study. Third, detailed information about cancer stage, severity, treatment history, and other clinical characteristics that may be associated with subsequent mental health services use is not collected in MEPS, all of which may affect mental health needs and mental health services use [11]. Cancer survivors included in nationally representative population-based surveys typically consist of survivors of common adult cancers (e.g., breast and prostate), often participating in the survey many years after their diagnosis [37]. Fourth, our analysis only estimated direct medical costs, which is only part of the societal costs associated with mental health care among cancer survivors. There are other unmeasured costs such as productivity loss and transportation costs to and from healthcare which are associated with self-reported mental health care use.

Cancer survivors were estimated to bear higher health and economic burden associated with mental health problems than individuals without a cancer history, especially among younger adults. Timely diagnosis and treatment of mental health problems among cancer survivors is essential for quality cancer care delivery and cancer survivorship [37]. However, 18 % of survivors with psychological distress have indicated that they cannot afford mental health care [37]. This study further highlights the need of feasible cost-effective strategies that integrate routine mental health screening and treatment into care for the growing population of cancer survivors [38]. This study also provides data for future evaluation of return on investment of intervention programs addressing mental health issues among cancer survivors.

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Table 1

Population characteristics by cancer history in 2008–2011 MEPS.

Age group	Age 65 years			Age 18–64 years		
	Cancer survivors			Cancer survivors		
	Diagnosed 1 year (n=381) Weighted %	Diagnosed >1 year (n=2,612) Weighted %	No history of cancer (n=9,536) Weighted %	Diagnosed 1 year (n=433) Weighted %	Diagnosed >1 year (n=2,518) Weighted %	No history of cancer (n=67,341) Weighted %
18–44				***	***	***
45–54				25.21	21.42	60.28
55–64	***	***		25.17	29.45	22.51
65–74	46.26	47.28	57.92	49.62	49.13	17.21
75+	53.74	52.72	42.08			
Sex	***	***		***	***	
Male	57.34	47.88	40.51	46.49	32.42	50.58
Female	42.66	52.12	59.49	53.51	67.58	49.42
Race/ethnicity	***	***		***	***	
Non-Hispanic white	86.89	88.60	73.55	83.44	81.80	63.50
Non-Hispanic black	6.81	5.51	10.52	7.64	7.50	12.54
Hispanic	4.90	3.54	9.47	6.41	7.13	16.43
Non-Hispanic other/multiple	1.39	2.35	6.46	2.51	3.58	7.53
Education when first entered MEPS		***			***	
Less than high school grad/missing	21.60	17.76	25.29	11.67	11.68	16.15
High school graduate	37.48	34.10	34.29	31.32	28.86	29.58
Some college or more	40.91	48.14	40.42	57.01	59.46	54.28
Marital status				**	***	
Married/living as married	55.67	55.45	53.57	62.06	62.26	52.57
Not married	44.33	44.55	46.43	37.94	37.74	47.43
Family income as a percentage of poverty		*			***	
Low income (less than 200 %)	32.15	30.90	34.73	28.22	25.14	29.76
Middle income (200 % to less than 400 %)	32.93	31.05	30.79	25.89	27.59	31.23
High income (greater than or equal to 400 %)	34.92	38.04	34.48	45.89	47.27	39.00

	Age 65 years			Age 18-64 years		
	Cancer survivors			Cancer survivors		
	Diagnosed 1 year (n=381) Weighted %	Diagnosed >1 year (n=2,612) Weighted %	No history of cancer (n=9,536) Weighted %	Diagnosed 1 year (n=433) Weighted %	Diagnosed >1 year (n=2,518) Weighted %	No history of cancer (n=67,341) Weighted %
Health insurance						
Any private	53.42	57.18	49.85	74.36	76.69	70.06
Public only	46.58	42.76	49.59	17.92	12.86	10.54
Uninsured	0.00	0.06	0.56	7.72	10.45	19.40
Usual source of care						
Yes	95.69	95.02	90.90	88.77	85.99	70.22
No	4.31	4.98	9.10	11.23	14.01	29.78
Number of known MEPS priority conditions (excluding Cancer)						
0	2.76	3.43	5.51	14.77	15.29	39.61
1	6.14	6.80	9.95	18.06	20.04	25.35
2	15.30	14.23	16.29	23.96	19.95	15.50
3	20.85	20.26	21.85	17.79	15.78	9.58
4+	54.94	55.28	46.40	25.43	28.95	9.97
Current smoking status						
Yes	8.77	8.58	9.91	22.32	22.31	20.23
No	91.23	91.42	90.09	77.68	77.69	79.77
Body mass index (BMI)						
Underweight (BMI< 18.5 kg/m ²)/missing	4.87	3.57	4.40	5.87	3.39	3.75
Normal weight (BMI 18.5-24.9 kg/m ²)	35.58	34.41	30.05	26.8	31.07	33.62
Overweight (BMI 25.0-29.9 kg/m ²)	34.54	36.33	37.90	32.27	33.92	33.38
Obese (BMI≥30.0 kg/m ²)	25.00	25.68	27.65	35.07	31.62	29.25

Weighted annual estimates for cancer survivors were 9.94 million for 65+ years (among those reported valid information on age at diagnosis, 1.22 million diagnosed 1 year and 8.45 million diagnosed >1 year) and 9.26 million for 18-64 years (among those reported valid information on age at diagnosis, 1.30 million diagnosed 1 year and 7.49 million diagnosed >1 year). For individuals without a cancer history, 25.67 million were for 65+ years and 171.60 million were for 18-64 years. Statistical significance are based on Pearson chi-square tests for comparisons to individuals without a cancer history corrected for the survey design with the second-order correction of Rao and Scott (1984) and are converted into an F statistic.

* Statistically significant at 0.05 level

** statistically significant at 0.01 level

*** statistically significant at 0.001 level

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Table 2
Mental health needs and mental health service use in the past 12 months by cancer history in 2008–2011 MEPS

	Cancer survivors				No history of cancer	
	Diagnosed <1 year		Diagnosed >1 year		Unadjusted %	Adjusted %
	Unadjusted %	Adjusted %	Unadjusted %	Adjusted %		
Age 65 years						
Mental health needs						
PHQ-2 screener (>2: screen positive)	8.80	8.54	9.67	10.13**	8.24	8.12
Kessler K6 (>12: screen positive)	4.96	4.95	4.44	4.77	4.72	4.60
Mental health services use						
Any MH visits	4.42	4.54	6.67	6.33	5.45	5.55
Any MH prescription drugs use	13.23	14.16	16.77	16.37*	13.57	13.64
Age 18–64 years						
Mental health needs						
PHQ-2 screener (>2: screen positive)	16.42	11.97*	14.60	11.03**	8.25	8.41
Kessler K6 (>12: screen positive)	11.37	7.42*	10.16	7.***	4.75	4.87
Mental health services use						
Any MH visits	14.45	9.59	14.07	9.99	8.40	8.59
Any MH prescription drugs use	15.38	8.63*	24.01	14.60***	11.09	11.49

Adjusted estimates are marginal effects by cancer history generated from logistic regression. The model adjusted for age, gender, race/ethnicity, marital status, education level, health insurance coverage, family income, BMI, current smoking status, usual source of care, and cancer history (diagnosed <=1 year, diagnosed >1 year, no history of cancer (comparison group)). Analyses are conducted separately for 18–64 and 65 years. Statistical significance is for comparisons between cancer survivors and adults without a cancer history using the adjusted estimates.

* Statistically significant at 0.05 level

** statistically significant at 0.01 level

*** statistically significant at 0.001 level. *MH* mental health

Table 3

Annual per capita mental health expenditure by cancer history, 2008–2011 MEPS

	Cancer survivors						No history of cancer					
	Diagnosed < 1 year			Diagnosed > 1 year			Mean			95 % CI		
	Unadjusted expenditure (\$)	Adjusted expenditure (\$)	95 % CI	Unadjusted expenditure (\$)	Adjusted expenditure (\$)	95 % CI	Unadjusted expenditure (\$)	Adjusted expenditure (\$)	95 % CI	Unadjusted expenditure (\$)	Adjusted expenditure (\$)	95 % CI
Age 65 years												
Total MH expenditure	\$93	(39–147)	\$98	(42–155)	\$160	(125–194)	\$159	(123–196)	\$132	(104–161)	\$134	(105–163)
Out-of-pocket MH expenditure	\$13	(7–20)	\$14	(7–22)	\$27	(18–36)	\$26	(19–34)	\$21	(15–28)	\$21	(16–26)
MH visit expenditure	\$40	(3–76)	\$49	(1–97)	\$86	(54–116)	\$94	(60–129)	\$67	(42–91)	\$65	(43–88)
MH drug expenditure	\$53	(11–95)	\$48	(21–75)	\$74	(61–88)	\$73	(59–87)	\$66	(53–79)	\$66	(53–78)
Age 18–64 years												
Total MH expenditure	\$278	(145–411)	\$164	(91–236)	\$429	(312–546)	\$304	(216–393)*	\$205	(187–223)	\$210	(192–229)
Out-of-pocket MH expenditure	\$28	(10–46)	\$18	(7–28)**	\$80	(54–104)	\$58	(40–77)	\$41	(37–44)	\$41	(37–45)
MH visit expenditure	\$179	(77–282)	\$109	(49–169)	\$238	(143–333)	\$179	(107–251)	\$105	(91–118)	\$107	(94–120)
MH drug expenditure	\$99	(49–149)	\$51	(26–76)**	\$191	(144–238)	\$124	(94–155)	\$100	(92–109)	\$103	(95–112)

Adjusted estimates are marginal effects by cancer history generated from two-part model with logistic regression for the first part and generalized linear regression with log link and gamma distribution for the second part. The model adjusted for age, gender, race/ethnicity, marital status, education level, health insurance coverage, family income, BMI, current smoking status, usual source of care, and cancer history (diagnosed < 1 year, diagnosed > 1 year, no history of cancer (comparison group)). Analyses were conducted separately for 18–64 and >65 years. Statistical significance is for adjusted estimates compared between cancer survivors and adults without a cancer history.

* Statistically significant at 0.05 level

** statistically significant at 0.01 level. CI confidence interval, MH mental health