CARE DELIVERY ReCAP

original contributions

Evaluating Mental Health–Related Symptoms Among Cancer Survivors During the COVID-19 Pandemic: An Analysis of the COVID Impact Survey

Jessica Yasmine Islam, PhD, MPH[1]; Denise C. Vidot, PhD[2]; and Marlene Camacho-Rivera, ScD, MPH[3]

QUESTION ASKED: In the United States, are cancer survivors experiencing mental health symptoms during the COVID-19 pandemic, and what are the determinants of these mental health symptoms?

SUMMARY ANSWER: Cancer survivors are reporting mental health symptoms during the COVID-19 pandemic, including anxiety, depression, hopelessness, and loneliness, particularly young adults, adults without a high school degree, women, and those with limited social support.

WHAT WE DID: We conducted secondary analyses of a US nationally representative survey, the COVID Impact Survey, to compare reported mental health symptoms among cancer survivors with the general US adult population. We estimated associations of mental health symptoms among cancer survivors using multinomial logistic regression. We estimated determinants of reporting at least one mental health symptom 3-7 times in the 7 days before survey administration among cancer survivors using multivariable Poisson regression.

WHAT WE FOUND: Cancer survivors were more likely to report feeling nervous, anxious, or on edge (adjusted odds ratio [aOR], 1.42; 95% CI, 1.07 to 1.90); depressed (aOR, 1.57; 95% CI, 1.18 to 2.09); lonely (aOR, 1.42; 95% CI, 1.05 to 1.91); and hopeless (aOR, 1.51; 95% CI, 1.11 to 2.06) 3-7 days per week in the last 7 days when compared with adults without cancer. Among cancer survivors, adults of age 30-44 years (adjusted prevalence ratio [aPR], 1.87; 95% CI, 1.18 to 2.95), females (aPR, 1.55; 95% CI, 1.12 to 2.13), adults without a high school degree (aOR, 1.79; 95% CI; 1.05 to 3.04), and adults with limited social support (aPR, 1.40; 95% CI, 1.01 to 1.95) were more likely to report at least one mental health–related symptom in the last 7 days (3-7 days/week).

BIAS, CONFOUNDING FACTOR(S), REAL-LIFE IMPLICATIONS: Providers of cancer survivors should prioritize evaluating mental health symptoms of their patients while engaging in survivorship care. However, opportunities for patient-provider interactions have reduced due to appointment cancelations during the COVID-19 pandemic. To ensure equitable access to care, telehealth medicine and opportunities for patient interactions outside of the clinic or hospital should be prioritized interventions. Findings from this analysis are based on a self-reported diagnosis of cancer. Mental health symptoms were also based on self-report and were not based on clinically validated scales such as the General Anxiety Disorder–7 (GAD-7) due to lack of data availability. Additionally, data on type of cancer and cancer treatment history were unavailable. Cancer-specific data should be prioritized for future assessments of mental health symptoms among cancer survivors because of heterogeneity in experiences of cancer survivors across cancer site and stage.

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ASSOCIATED CONTENT

Appendix

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abstract

PURPOSE The COVID-19 pandemic has affected the mental health of adults in the United States because of recommended preventive behaviors such as physical distancing. Our objective was to evaluate mental health symptoms and identify associated determinants among cancer survivors during the COVID-19 pandemic in the United States.

METHODS We used nationally representative data of 10,760 US adults from the COVID-19 Impact Survey. We defined cancer survivors as adults with a self-reported diagnosis of cancer (n = 854, 7.6%). We estimated associations of mental health symptoms among cancer survivors using multinomial logistic regression. We estimated determinants of reporting at least one mental health symptom 3-7 times in the 7 days before survey administration among cancer survivors using multivariable Poisson regression.

RESULTS Cancer survivors were more likely to report feeling nervous, anxious, or on edge (adjusted odds ratio [aOR], 1.42; 95% CI, 1.07 to 1.90); depressed (aOR, 1.57; 95% CI, 1.18 to 2.09); lonely (aOR, 1.42; 95% CI, 1.05 to 1.91); and hopeless (aOR, 1.51; 95% CI, 1.11 to 2.06) 3-7 days per week in the last 7 days when compared with adults without cancer. Among cancer survivors, adults of age 30-44 years (adjusted prevalence ratio [aPR], 1.87; 95% CI, 1.18 to 2.95), females (aPR, 1.55, 95% CI, 1.12 to 2.13), adults without a high school degree (aPR, 1.79; 95% CI, 1.05 to 3.04), and adults with limited social interaction (aPR, 1.40, 95% CI, 1.01 to 1.95) were more likely to report at least one mental health–related symptom in the last 7 days (3-7 days/week).

CONCLUSION Cancer survivors are reporting mental health symptoms during the COVID-19 pandemic, particularly young adults, adults without a high school degree, women, and survivors with limited social support.

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INTRODUCTION

The WHO declared COVID-19 a pandemic in March 2020 because of the alarming spread and severity of the disease globally.[1] As of November 18, 2020, more than 230,000 adults have died because of COVID-19 in the United States.[2] Older adults with existing chronic diseases are at higher risk of morbidity and mortality related to COVID-19,[3] including cancer survivors who we define as those still living after a cancer diagnosis.[4,5] Public health agencies have recommended preventive behaviors such as maintaining six feet distance from others, avoiding high-risk people, and self-quarantining at home to slow the spread of the COVID-19 infection.[6] Currently, there is no evidence to suggest different precautions that cancer survivors should take to avoid contracting the infection that leads to COVID-19. However, cancer survivors are at a higher risk than other adults because of several factors, including generally older age, frequent comorbidities, and potentially weakened immune system if they are undergoing active treatment.[7]

The COVID-19 pandemic has provided a new source of anxiety and stress for cancer survivors because of both their higher risk of COVID-19–related mortality and the recommended COVID-19 preventive behaviors that may lead to social isolation.[8] Research conducted before the COVID-19 pandemic shows that cancer survivors may experience unique mental health issues such as anxiety, depression, fear of cancer recurrence, and financial stress or financial toxicity.[9-11] Mental health deterioration of cancer survivors is of concern as poor mental health can be a barrier to engaging in survivorship care as well as disrupt quality of life;[12] however, limited research exists on the impact of the COVID-19 pandemic on the mental health of cancer survivors in the United States Our objective was to evaluate the prevalence and determinants of reporting mental health symptoms among cancer survivors during the COVID-19 pandemic. We

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hypothesized that cancer survivors will be more likely to report mental health–related symptoms compared with adults without cancer.

METHODS

COVID-19 Impact Survey

Data for these analyses were obtained from the publicly available COVID-19 Household Impact Survey conducted by NORC at the University of Chicago for the Data Foundation. The COVID-19 Household Impact Survey provides national and regional statistics about physical health, mental health, economic security, and social dynamics in the United States[13] The survey is designed to provide weekly estimates of the US adult household population nationwide. Currently, data from week 1 (April 20-26, 2020), week 2 (May 4-10, 2020), and week 3 (May 30-June 8, 2020) are available, which were merged for this analysis.

AmeriSpeak Sample

Funded and operated by NORC at the University of Chicago, AmeriSpeak is a probability-based panel designed to be representative of the US household population. During the initial recruitment phase of the AmeriSpeak panel, randomly selected US households were sampled using area probability and address-based sampling, with a nonzero probability of selection from the NORC National Sample Frame. These sampled households were then contacted by US mail, telephone, and field interviewers. The panel provides sample coverage of approximately 97% of the US household population. Those excluded from the sample include people with PO Box–only addresses, addresses not listed in the USPS Delivery Sequence File, and newly constructed dwellings. AmeriSpeak panelists participate in studies conducted by NORC on behalf of governmental agencies, academic researchers, and media and commercial organizations. Interviews were conducted in English and Spanish. In households with more than one adult panel member, only one was selected at random for the sample. Invited panel members were given the option to complete the survey online or by telephone with an NORC telephone interviewer. The number of participants invited and the percentage of interviews completed by week are as follows: 11,133 invited with 19.7% interviews completed during week 1; 8,570 invited with 26.1% interviews completed (week 2); and 10,373 invited with 19.7% interviews completed (week 3). Panelists were offered a $5, in US dollars (USD), monetary incentive for completing the survey. The analytic sample includes 10,760 adults nationwide. The final analytic sample was weighted to reflect the US population of adults of age ≥ 18 years. The demographic weighting variables were obtained from the 2020 Current Population Survey.

Cancer Survivors

We defined cancer survivors as those participants with a self-reported cancer diagnosis. Participants were asked the following question: Has a doctor or other healthcare provider ever told you that you have any of the following: diabetes; high blood pressure or hypertension; heart disease, heart attack, or stroke; asthma; chronic lung disease or chronic obstructive pulmonary disease (COPD); bronchitis or emphysema; allergies; a mental health condition; cystic fibrosis; liver disease or end-stage liver disease; cancer; a compromised immune system; or overweight or obesity. We defined those who selected cancer as a cancer survivor, similar to our previously published work.[14]

Primary Outcomes

Our primary outcomes for this analysis were social support and mental health symptoms. To evaluate social support, we used a series of questions evaluating social support from neighbors, family, and friends and by volunteering currently and before the start of the COVID-19 pandemic. Next, to evaluate mental health symptoms, participants were asked to report symptoms of anxiety, depression, loneliness, hopelessness, and physical reaction to experiences during the COVID-19 pandemic in the 7 days before survey administration. Participants were able to choose from the following list of options for each mental health symptom: not at all or < 1 day, 1-2 days, 3-4 days, and 5-7 days. For multivariable analyses, we categorized the frequency of mental health symptoms as follows: not at all or less than 1 day, 1-2 days per week, and 3-7 days per week because of limited sample size. Specific questions evaluating social support and mental health symptoms are presented in Table 1.

Covariates

The following covariates were included in the multivariable analyses: age (18-29, 30-44, 45-59, or 60 +), sex (male or female), marital status (married or living with a partner; widowed, divorced, or separated; or never married), race or ethnicity categories (non-Hispanic [NH] White, NH-Black, Hispanic, NH-Asian, or NH-other), education categories (no high school diploma, high school graduate or equivalent, some college, or baccalaureate degree or above), employment status (employed or unemployed), household income (< $50,000; $ 50,000 to < $100,000; or ≥ $100,000, in USD), population density (rural, suburban, or urban), census region (Northeast, Midwest, South, or West), insurance status (insured or uninsured), comorbid conditions (yes or no), physical symptoms reported in the last 7 days (yes or no), and current limited social interaction. We defined limited social interaction as follows: cancer survivors who chose once a month or not at all to either of the following questions: (1) In the past month, how often did you communicate with your friends and family by phone, text, e-mail, app, or using the Internet? (2) In the past month, how often did you talk with any of your neighbors?

Data Analysis

Descriptive statistics are summarized, by cancer survivorship status, in percentages among all respondents and include a margin of error of ± 3.0% at the 95% CIs. We used chi-square tests to compare social support and mental health symptoms among cancer survivors with those of the general US adult population. Next, we used multinomial logistic regression to compare mental health symptoms reported in the last 7 days among cancer survivors with US adults without cancer after adjustment for age, sex, race or ethnicity, annual household income, insurance status, employment status, and area of residence (urban or rural). To address concerns regarding existing mental health symptoms before the COVID-19 pandemic, we conducted a sensitivity analysis to evaluate mental health symptoms among those without a history of a mental health condition based on self-report. We were able to assess the history of a mental health condition through the following question: Have you ever been diagnosed by a doctor or healthcare provider who said you have a mental health condition? Although mental health condition may include several conditions, we were able to focus on those without clinical depression and anxiety using this approach.

To identify demographic groups that may be more likely to report mental health symptoms, we estimated determinants of reporting at least one mental health symptom (nervous or anxious, depressed, lonely, hopeless, or experiencing physical reaction when thinking about experiences during COVID-19) three to seven times a week. We computed prevalence ratios with Poisson regression using robust estimation of standard errors.[15-17] Potential variables for inclusion in the model were assessed using available sociodemographic variables and bivariate Poisson regression analysis. Because of the exploratory nature of this analysis using a predictive framework, an arbitrary *P* value of < 0.10 was used as the criterion to include the variable in the multivariable Poisson regression model. For multivariable Poisson regression models, adjusted prevalence ratios (aPRs) and 95% CIs for each independent variable were calculated. Based on the exploratory nature of this analysis, we did not include an adjustment for multiple comparisons.[18,19] All statistical analyses were conducted using Stata IC 15 (StataCorp LLC, College Station, TX). Sampling weights were applied to provide results that were nationally representative of the US adult population.

RESULTS

Table 1 summarizes the characteristics of the study population stratified by cancer survivorship status. Overall, there were 854 (7.8%) cancer survivors. Most cancer survivors were of age 60 + (65%) and NH-White (74%). Over half were female (52%) and married or living with a partner (57%). Among cancer survivors, about half reported they trusted either all or most people living in their neighborhood, and this proportion was not significantly different than respondents without cancer. Additionally, 56% of cancer survivors reported they speak to their neighbors either basically every day or a few times a week and more frequently than adults without cancer ($P < .001$). Before the COVID-19 pandemic, cancer survivors spoke to their neighbors more frequently (55%) than adults without cancer (44%) ($P < .001$). Among cancer survivors who spoke to their neighbors basically every day before the start of the COVID-19 pandemic, 62% continued this behavior, and 34% reported in the last month to speak to their neighbors a few times a week (Fig 1A). Additionally, among cancer survivors who did not speak to their neighbors at all before the COVID-19 pandemic, less than half (42%) continued to not speak with their neighbors; however, 23% reported in the last month they now speak to their neighbors a few times a week (Fig 1A). Approximately 90% of both cancer survivors and adults without cancer reported communicating with their friends and family either basically every day or a few times a week both before the COVID-19 pandemic and in the last month (Table 1). Among cancer survivors who reported they communicate with their friends and family every day, 93% continued to speak every day to them in the past month (Fig 1B). Prior to the pandemic, 23% of cancer survivors reported they volunteered for organizations; however, only 10% of cancer survivors reported volunteering in the past month.

Approximately 60% of cancer survivors reported feeling nervous, anxious, or on edge not at all or less than 1 day in the past week (Table 1). Among cancer survivors, 16% reported feeling depressed and 14% reported feeling lonely in the last 7 days before survey administration. Additionally, approximately 13% of cancer survivors felt hopeless about the future. After adjustment for all covariates, cancer survivors were more likely to report feeling nervous, anxious, or on edge than those without cancer both 1-2 days per week (adjusted odds ratio [aOR], 1.29; 95% CI, 1.01 to 1.64) and 3-7 days per week (aOR, 1.42; 95% CI, 1.07 to 1.90)(Fig 2). Cancer survivors were more likely to report feeling depressed in the last 3-7 days per week compared with those without cancer (aOR, 1.57; 95% CI, 1.18 to 2.09). Cancer survivors were more likely to report feeling lonely (aOR, 1.42; 95% CI, 1.05 to 1.91) and hopeless about the future (aOR, 1.51; 95% CI, 1.11 to 2.06) 3-7 times in the last week compared with adults without cancer (Fig 2). Sensitivity analyses demonstrated consistent results when we excluded those with an existing mental health condition based on self-report (Appendix Fig A1, online only).

Table 2 summarizes determinants of reporting at least one mental health symptom in the 7 days before survey administration, including feeling nervous, depressed, lonely, hopeless, and experiencing a physical reaction to thinking about experiences during the COVID-19 pandemic, among cancer survivors. Compared with cancer survivors of age ≥ 60 years, those of age 30-44 years (aPR, 1.87, 95% CI, 1.18 to 2.95) and 45-59 years (aPR, 1.48; 95% CI, 1.02 to

TABLE 1. Demographics, Social Support, and Mental Health Symptoms Among COVID Impact Survey Respondents (n = 10,760), a Nationally Representative Survey of the United States, Stratified by Cancer Diagnosis (April-June 2020)

	Total		Cancer Survivors		Respondents Never Diagnosed with Cancer		
Characteristic	**Col %**	**95% CI**	**Col %**	**95% CI**	**Col %**	**95% CI**	***P***
Age							
18-29	20.5	19.3 to 21.9	3.0	1.8 to 4.9	22.0	20.7 to 23.4	
30-44	25.3	24.2 to 26.4	9.4	6.9 to 12.6	26.6	25.5 to 27.8	
45-59	24.3	23.2 to 25.4	23.0	19.4 to 27.0	24.4	23.2 to 25.5	
60 +	29.9	28.8 to 31.1	64.7	60.3 to 68.9	27.0	25.8 to 28.2	
Female	51.6	50.3 to 53.0	52.4	48.1 to 56.8	51.6	50.2 to 53.0	
Marital status							
Married or living with partner	57.3	55.9 to 58.6	57.0	52.6 to 61.3	57.3	55.9 to 58.7	
Widowed, divorced, or separated	18.5	17.5 to 19.5	31.2	27.3 to 35.4	17.4	16.4 to 18.4	
Never married	24.2	23.0 to 25.5	11.8	9.1 to 15.3	25.3	24.0 to 26.6	
Race or ethnicity							
White, NH	62.1	60.8 to 63.4	74.3	70.0 to 78.1	61.1	59.7 to 62.5	
Black, NH	11.6	10.8 to 12.4	11.6	8.7 to 15.4	11.6	10.7 to 12.5	
Hispanic	16.4	15.3 to 17.5	7.8	5.6 to 10.6	17.1	16.0 to 18.3	
Asian, NH	4.9	4.2 to 5.7	1.4	0.7 to 3.0	5.2	4.5 to 6.0	
Other, NH	3.5	3.2 to 4.0	2.6	1.8 to 3.7	3.6	3.2 to 4.1	
Employed in the past 7 days	49.9	48.6 to 51.3	31.9	28.1 to 36.2	51.5	50.1 to 52.9	
Uninsured	8.8	8.0 to 9.6	3.0	1.8 to 4.9	9.2	8.4 to 10.1	
Education							
No HS diploma	9.6	8.7 to 10.7	6.4	4.4 to 9.3	9.9	8.9 to 11.0	
HS graduate	28.1	26.8 to 29.5	30.3	26.0 to 34.9	28.0	26.6 to 29.4	
Some college	27.7	26.7 to 28.8	27.9	24.7 to 31.4	27.7	26.7 to 28.8	
Baccalaureate or above	34.5	33.3 to 35.7	35.4	31.3 to 39.7	34.4	33.2 to 35.7	
Household income							
< $50,000 USD	45.5	44.2 to 46.9	48.5	44.2 to 52.9	45.3	43.9 to 46.7	
$ 50,000 to < $100,000 USD	32.1	30.9 to 33.4	26.9	23.4 to 30.8	32.6	31.3 to 33.9	
≥ $100,000 USD	22.4	21.3 to 23.5	24.5	20.9 to 28.5	22.2	21.0 to 23.4	
Population density							
Rural	9.0	8.3 to 9.8	13.4	10.4 to 17.0	8.7	8.0 to 9.4	
Suburban	18.7	17.7 to 19.7	20.0	16.9 to 23.6	18.6	17.6 to 19.6	
Urban	72.3	71.1 to 73.4	66.6	62.3 to 70.7	72.7	71.5 to 73.9	
Social support							
Would you say that you can trust all the people, most of the people, some of the people, or none of the people in your neighborhood?							.353
All	7.0	6.4 to 7.7	7.4	5.5 to 9.7	7.0	6.3 to 7.7	
Most	44.8	43.5 to 46.1	44.1	39.8 to 48.5	44.9	43.5 to 46.3	
Some	41.4	40.1 to 42.7	40.1	35.8 to 44.6	41.5	40.1 to 42.9	
None	6.6	6.0 to 7.4	8.4	6.5 to 10.9	6.5	5.8 to 7.2	
In the past month, how often did you talk with any of your neighbors?							< .001
Basically every day	12.7	11.8 to 13.6	13.0	10.5 to 15.9	12.6	11.8 to 13.6	

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TABLE 1. Demographics, Social Support, and Mental Health Symptoms Among COVID Impact Survey Respondents (n = 10,760), a Nationally Representative Survey of the United States, Stratified by Cancer Diagnosis (April-June 2020) (continued)

	Total		Cancer Survivors		Respondents Never Diagnosed with Cancer		
Characteristic	**Col %**	**95% CI**	**Col %**	**95% CI**	**Col %**	**95% CI**	***P***
A few times a week	33.1	31.8 to 34.3	42.6	38.2 to 47.0	32.2	31.0 to 33.6	
A few times a month	27.4	26.2 to 28.7	27.4	23.6 to 31.5	27.4	26.1 to 28.7	
Once a month	13.4	12.5 to 14.4	7.6	5.8 to 10.0	13.9	12.9 to 15.0	
Not at all	13.4	12.5 to 14.4	9.5	7.2 to 12.3	13.8	12.8 to 14.8	
During a typical month prior to March 1, 2020, when COVID-19 began spreading in the United States, how often did you talk with any of your neighbors?							< .001
Basically every day	12.9	12.1 to 13.9	15.6	12.8 to 19.0	12.7	11.8 to 13.7	
A few times a week	31.8	30.6 to 33.0	39.2	35.0 to 43.6	31.1	29.9 to 32.4	
A few times a month	25.4	24.3 to 26.6	21.1	17.8 to 24.8	25.8	24.6 to 27.0	
Once a month	14.8	13.8 to 15.8	10.7	8.2 to 13.7	15.1	14.1 to 16.2	
Not at all	15.1	14.1 to 16.2	13.4	10.4 to 17.1	15.2	14.2 to 16.4	
In the past month, how often did you communicate with friends and family by phone, text, e-mail, app, or using the Internet?							.808
Basically every day	63.6	62.3 to 64.8	63.0	58.7 to 67.0	63.6	62.3 to 65.0	
A few times a week	25.7	24.6 to 26.9	26.5	22.9 to 30.4	25.6	24.5 to 26.9	
A few times a month	7.8	7.2 to 8.6	8.4	6.4 to 10.9	7.8	7.1 to 8.6	
Once a month	1.7	1.4 to 2.1	1.3	0.5 to 3.4	1.7	1.4 to 2.1	
Not at all	1.2	0.9 to 1.5	0.8	0.4 to 1.7	1.2	0.9 to 1.6	
During a typical month prior to March 1, 2020, when COVID-19 began spreading in the United States, how often did you communicate with friends and family by phone, text, e-mail, app, or using the Internet?							.174
Basically every day	54.3	53.0 to 55.6	51.8	47.3 to 56.1	54.5	53.1 to 55.9	
A few times a week	32.4	31.2 to 33.6	34.3	30.2 to 38.7	32.2	30.9 to 33.5	
A few times a month	10.5	9.7 to 11.4	12.3	9.9 to 15.2	10.4	9.6 to 11.3	
Once a month	2.0	1.7 to 2.4	1.2	0.6 to 2.5	2.1	1.7 to 2.5	
Not at all	0.8	0.6 to 1.1	0.5	0.2 to 1.2	0.8	0.6 to 1.1	
In the past month, did you spend any time volunteering for any organization or association or not?							.228
Yes	10.0	9.2 to 10.8	11.5	9.1 to 14.5	9.9	9.1 to 10.7	
No	90.0	89.2 to 90.8	88.5	85.5 to 90.9	90.1	89.3 to 90.9	
During a typical month prior to March 1, 2020, when COVID-19 began spreading in the United States, did you spend any time volunteering for any organization or association or not?							< .001
Yes	23.9	22.8 to 25.0	31.3	27.4 to 35.6	23.3	22.1 to 24.4	
No	76.1	75.0 to 77.2	68.7	64.4 to 72.6	76.7	75.6 to 77.9	
Mental health symptoms							
In the past 7 days, how often have you felt nervous, anxious, or on edge?							.505
Not at all or < 1 d	62.0	60.6 to 63.2	63.5	59.1 to 67.7	61.8	60.4 to 63.2	
1-2 d	21.9	20.8 to 23.0	22.2	18.7 to 26.2	21.8	20.7 to 23.0	
3-7 d	16.2	15.2 to 17.2	14.3	11.4 to 17.8	16.3	15.3 to 17.5	
In the past 7 days, how often have you felt depressed?							.95

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TABLE 1. Demographics, Social Support, and Mental Health Symptoms Among COVID Impact Survey Respondents (n = 10,760), a Nationally Representative Survey of the United States, Stratified by Cancer Diagnosis (April-June 2020) (continued)

	Total		Cancer Survivors		Respondents Never Diagnosed with Cancer		
Characteristic	**Col %**	**95% CI**	**Col %**	**95% CI**	**Col %**	**95% CI**	***P***
Not at all or < 1 d	61.1	59.8 to 62.4	61.0	56.5 to 65.3	61.1	59.7 to 62.4	
1-2 d	22.1	21.0 to 23.2	22.6	19.0 to 26.7	22.1	21.0 to 23.2	
3-7 d	16.8	15.8 to 17.9	16.4	13.3 to 20.0	16.8	15.8 to 18.0	
In the past 7 days, how often have you felt lonely?							.332
Not at all or < 1 d	61.1	59.8 to 62.4	64.4	59.9 to 68.6	60.8	59.4 to 62.2	
1-2 d	23.0	21.8 to 24.1	21.3	17.6 to 25.5	23.1	21.9 to 24.3	
3-7 d	15.9	15.0 to 17.0	14.3	11.5 to 17.8	16.1	15.1 to 17.1	
In the past 7 days, how often have you felt hopeless about the future?							.277
Not at all or < 1 d	61.1	59.8 to 62.4	61.4	56.9 to 65.6	61.1	59.7 to 62.4	
1-2 d	23.6	22.5 to 24.7	25.6	21.9 to 29.8	23.4	22.3 to 24.6	
3-7 d	15.3	14.3 to 16.3	13.0	10.3 to 16.4	15.5	14.5 to 16.5	
In the past 7 days, how often have you had physical reactions such as sweating, trouble breathing, nausea, or a pounding heart when thinking about your experience with the coronavirus pandemic?							.017
Not at all or < 1 d	90.6	89.8 to 91.4	93.7	91.4 to 95.4	90.3	89.5 to 91.2	
1-2 d	5.6	5.1 to 6.2	4.6	3.2 to 6.6	5.7	5.1 to 6.4	
3-7 d	3.8	3.3 to 4.4	1.7	0.9 to 3.3	3.9	3.4 to 4.6	

Abbreviations: HS, high school; NH, non-Hispanic.

2.16) were more likely to report mental health symptoms. Female cancer survivors were more likely to report mental health symptoms compared with male cancer survivors (aPR, 1.55; 95% CI, 1.12 to 2.13). Cancer survivors without a high school diploma had a 79% higher prevalence of mental health symptoms compared with those with a baccalaureate degree or above (aPR, 1.79; 95% CI, 1.05 to 3.04). Cancer survivors with limited social interaction were more likely to report mental health symptoms (aPR, 1.40; 95% CI, 1.01 to 1.95). Finally, NH-Black cancer survivors were less likely to report mental health symptoms compared with NH-White cancer survivors (aPR, 0.31; 95% CI, 0.15 to 0.66).

DISCUSSION

Our study demonstrates several important findings concerning the psychological impacts of the COVID-19 pandemic among cancer survivors. Cancer survivors were more likely to report mental health symptoms, such as anxiety and depressive symptoms, compared with adults without a history of a cancer diagnosis. Additionally, certain demographic groups of cancer survivors were more likely to report mental health symptoms including younger adults, women, and cancer survivors without a high school degree. Cancer survivors with limited social interaction were also more likely to report mental health symptoms. Finally, we found that NH-Black cancer survivors may be less likely to report mental health symptoms compared with NH-White survivors. These findings may have implications for cancer care as poor mental health symptoms among cancer survivors may lead to barriers to successful treatment adherence and lower survival.[20]

Although there are limited empirical studies that have compared the mental health impacts of COVID-19 among cancer survivors with the general population,[21] prior studies have documented that cancer survivors have unique emotional needs related to anxiety and depression because of fear of recurrences as well as family and interpersonal strain.[8,9,11] For example, a cross-sectional survey of patients with cancer in China observed a high prevalence of mental health problems, including depression, anxiety, posttraumatic stress disorder, and hostility during the COVID-19 pandemic.[22] In the United States, a study using a nationally representative sample of adults showed a higher prevalence of anxiety and depressive symptoms during the COVID-19 pandemic, due in part to social isolation and economic hardship.[23] Our study also suggests an important role of social support among cancer survivors during the COVID-19 pandemic.[24,25]

We observed that cancer survivors were more likely to volunteer before the COVID-19 pandemic and also were

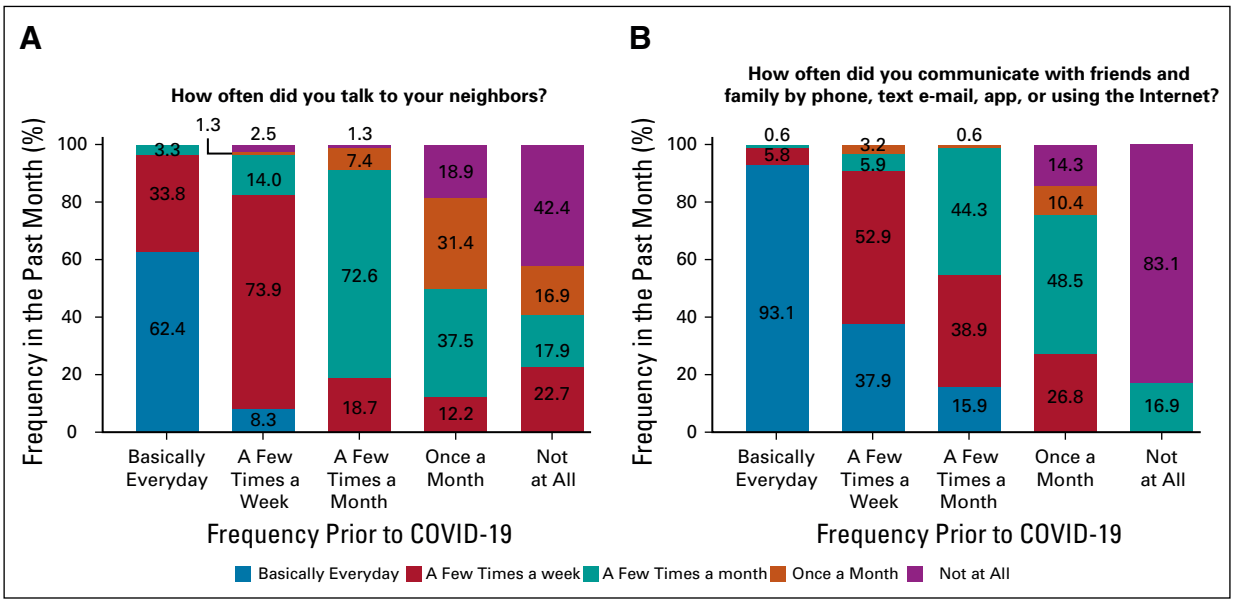

FIG 1. Change in social support after the COVID-19 pandemic among cancer survivors in the United States (n = 834).

more likely to speak with their neighbors than other adults both before and after the start of the COVID-19 pandemic, indicating they may have stronger social networks.[26] Although studies examining social network patterns during the COVID-19 pandemic among adults with and without cancer are sparse, prior studies have documented increased likelihood of participation among online social support groups and health-related Internet use among cancer survivors compared with those without a cancer history.[27,28] Increased anxiety, depression, loneliness, and hopelessness among cancer survivors is of major concern because of the potential impacts on quality of life and adherence to cancer survivorship recommendations, including required continuing treatment or wellness recommendations such as exercise and eating healthy.[29,30]

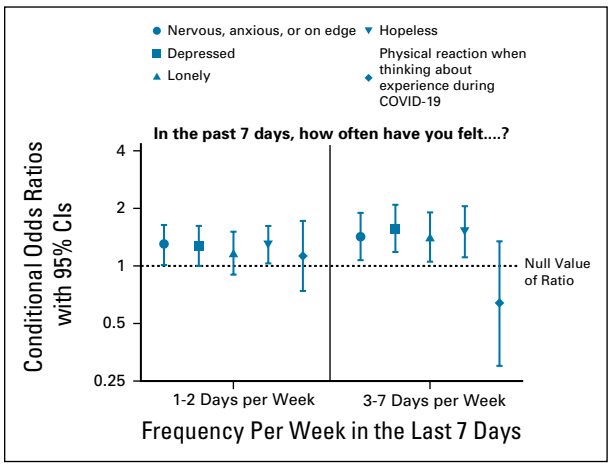

FIG 2. Associations of reported mental health symptoms in the last 7 days among cancer survivors compared with the general adult population in the United States (n = 10,760). Reference group: not at all or less than 1 day. Conditional odds ratios presented on the logarithmic scale. Models adjusted for age, sex, race or ethnicity, annual household income, insurance status, and area of residence (urban or rural).

Recent work demonstrates that cancer survivors are at higher risk of suicide in comparison with the general population,[31,32] further underscoring the significance of evaluating mental health symptoms during the COVID-19 pandemic. Social isolation and deteriorated mental health symptoms during the COVID-19 pandemic can be an additional suicide risk during these unprecedented times. Providers should prioritize evaluating mental health symptoms among cancer survivors during their patient-provider interactions; however, recent data demonstrate that cancer survivors are canceling their doctor's appointments during the COVID-19 pandemic, which may reduce opportunities to interact with patients (15). To address the needs of cancer survivors, many cancer survivorship programs in the United States have converted to telehealth and certain programs have seen success particularly when insurance reimbursement was extended to cover group behavioral telehealth interventions in response to the needs of patients during COVID-19.[33] However, although advances in telehealth offer potential for accessible psychosocial care, significant barriers exist to equitable ease of use and access to the Internet and general technology.[34] Alternative and creative programs, such as group visits, to scale up mental health treatment, are needed to ensure equitable access to care and address the needs of cancer survivors.[35]

A notable strength of our analysis is we used nationally representative survey data and therefore obtained a

TABLE 2. Determinants of Experiencing at Least One Mental Health–Related Symptom in the Last 7 days (3-7 d/wk) Among Cancer Survivors Included in the COVID Impact Survey, A Nationally Representative Survey of the United States (n = 854) (April-June 2020)

Characteristic	Unadjusted PR	95% CI	Adjusted PR	95% CI
Age				
18-29	2.93	1.97 to 4.34	1.81	0.91 to 3.62
30-44	2.08	1.39 to 3.09	1.87	1.18 to 2.95
45-59	1.41	1.00 to 1.98	1.48	1.02 to 2.16
60 +	Ref.		Ref.	
Sex				
Male	Ref.		Ref.	
Female	1.56	1.16 to 2.12	1.55	1.12 to 2.13
Marital status				
Married or living with partner	Ref.		—	
Widowed, divorced, or separated	1.10	0.80 to 1.50		
Never married	1.32	0.85 to 2.04		
Education				
No HS diploma	1.60	1.00 to 2.60	1.79	1.05 to 3.04
HS graduate	0.94	0.65 to 1.36	0.95	0.62 to 1.45
Some college	0.80	0.57 to 1.11	0.90	0.63 to 1.29
Baccalaureate or above	Ref.		Ref.	
Race or ethnicity[a]				
White, NH	Ref.		Ref.	
Black, NH	0.59	0.31 to 1.14	0.31	0.15 to 0.66
Hispanic	1.31	0.80 to 2.14	1.01	0.55 to 1.86
Asian, NH	0.96	0.28 to 3.25	0.71	0.24 to 2.10
Other, NH	0.80	0.43 to 1.15	0.88	0.45 to 1.69
Uninsured	0.62	0.27 to 1.46	0.52	0.19 to 1.37
At least one comorbid condition[b]	1.15	0.81 to 1.63	—	
At least one COVID-19–related symptom[c]	1.26	0.90 to 1.77	1.03	0.74 to 1.44
Current limited social interaction	1.27	0.91 to 1.76	1.40	1.01 to 1.95
Employed or self-employed	1.35	1.01 to 1.80	1.17	0.84 to 1.63
Region				
Northeast	Ref.		—	
Midwest	0.84	0.54 to 1.31		
South	0.85	0.56 to 1.28		
West	0.81	0.52 to 1.26		
Household income				
< $50,000 USD	1.00	0.69 to 1.43	—	
$50,000 to < $100,000 USD	0.96	0.65 to 1.44		
≥ $100,000 USD	Ref.			
Population density				
Rural	0.84	0.53 to 1.35	—	
Suburban	0.99	0.70 to 1.41		
Urban	Ref.			

NOTE. Cancer survivors who chose once a month or not at all to the following questions: (1) In the past month, how often did you communicate with your friends and family by phone, text, e-mail, app, or using the Internet? and (2) In the past month, how often did you talk with any of your neighbors?

Abbreviations: COPD, chronic obstructive pulmonary disease; HS, high school; NH, non-Hispanic; PR, prevalence ratio; Ref, Reference; USD, US dollars.

[a]N = 14 race or ethnicity values missing as they were suppressed because of disclosure risk.

[b]Comorbid conditions include diabetes; high blood pressure; heart disease, heart attack, or stroke; asthma; COPD; bronchitis or emphysema; allergies; a mental health condition; cystic fibrosis; liver disease; and a compromised immune system.

[c]Symptoms include fever, chills, runny or stuffy nose, chest congestion, skin rash, cough, sore throat, sneezing, muscle or body aches, headaches, fatigue or tiredness, shortness of breath, abdominal discomfort, nausea or vomiting, diarrhea, changed or loss of sense of taste or smell, and loss of appetite.

representative sample of cancer survivors in the United States. However, our results should be interpreted with several limitations in mind. We relied on self-report of symptoms reported in the 7 days before survey administration. Chronic conditions, including a prior cancer diagnosis, were based on self-report, leading to the potential for measurement error in our definition of a cancer survivor. Although more reliable, data on psychological distress measured using validated scales, such as the General Anxiety Disorder–7 (GAD-7), were not available. We were unable to measure and account for important cancer-related variables such as site, stage, or type of treatment (surgery, chemo, or radiation). We were unable to assess if the respondent was currently undergoing cancer treatment, and if so, how long they have been undergoing treatment or time since treatment. Importantly, data regarding the cancer survivor's mental health symptoms before COVID-19 were unavailable, and therefore we are unable to conclude if the mental health symptoms are COVID-19–related or because of another cause. We conducted sensitivity analyses to address this concern; however, future research using existing longitudinal cohorts to compare mental health symptoms among cancer survivors before and after COVID-19 pandemic is needed.

In conclusion, we demonstrated that cancer survivors are reporting mental health symptoms during the COVID-19 pandemic. Providers should prioritize evaluating the mental health symptoms of cancer survivors and use established validated scales to diagnose clinical depression or anxiety to ensure survivors are engaging in the survivorship care they need. Optimizing equitable access to telehealth opportunities for engagement of survivorship care should be prioritized. Future qualitative research into experiences of cancer survivors during the COVID-19 pandemic to elucidate their experience and potential mental health impact should be conducted. As Internet-based interventions to promote social support among cancer survivors have been found to have a positive impact on psychological well-being and quality-of-life outcomes,[36-39] future studies should engage cancer survivors through e-Health tools during times of social isolation and quarantine during the COVID-19 pandemic.

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

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Administrative support: Marlene Camacho-Rivera
Collection and assembly of data: Jessica Yasmine Islam
Data analysis and interpretation: Jessica Yasmine Islam, Marlene Camacho-Rivera
Manuscript writing: All authors
Final approval of manuscript: All authors
Accountable for all aspects of the work: All authors

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

Evaluating Mental Health–Related Symptoms Among Cancer Survivors During the COVID-19 Pandemic: An Analysis of the COVID Impact Survey

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Open Payments is a public database containing information reported by companies about payments made to US-licensed physicians (Open Payments).

No potential conflicts of interest were reported.

APPENDIX

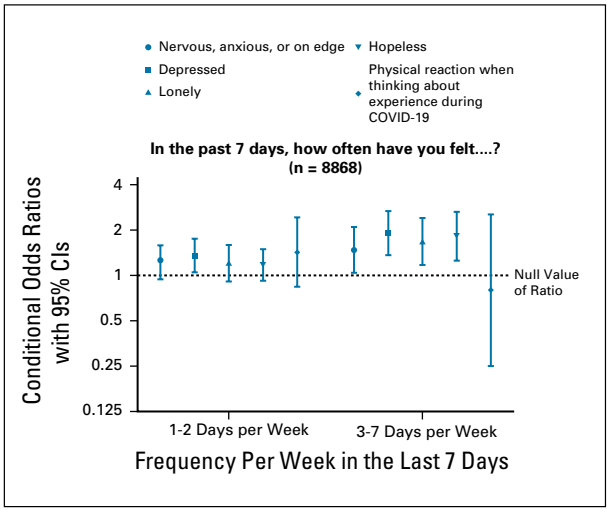

FIG A1. Associations of reported mental health symptoms in the last 7 days among cancer survivors compared with the general adult population in the United States, excluding those with a self-reported mental health condition (n = 10,760). Reference group: not at all or less than 1 day. Conditional odds ratios presented on the logarithmic scale. Models adjusted for age, sex, race or ethnicity, annual household income, insurance status, and area of residence (urban or rural). We excluded adults with a self-reported mental health condition.