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ORIGINAL ARTICLE

Psychological distress among adult cancer survivors: importance of survivorship care plan

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Abstract

Purpose The goal of our study was to better understand the importance of adult cancer survivors (ACS) receiving Survivorship Care Plans (SCP) especially for their psychological well-being. We hypothesize that the receipt of SCP would decrease the likelihood of symptoms of current depression (SCD) in this population.

Methods We tested our hypothesis by using a representative sample of ACS, more than 1 year from cancer diagnosis, who responded to the 2010 BRFSS survey. We used follow-up care instructions (FCI) and treatment summaries (TS) as a marker of SCP. Weighted multivariable logistic regression models were used to investigate the association between FCI and TS (individually and in combination) and SCD, among short-term (≤5 years from cancer diagnosis) and long-term (>5 years from cancer diagnosis) ACS.

Results Out of 3191 final study participants, 32.8 % were short-term, and 67.2 % were long-term ACS. Among short-term ACS, the adjusted odds of SCD were 3 times higher (adjusted odds ratio (AOR) 3.14 [95%CI 1.29–7.65]) for those who did not receive TS + FCI than for those who received them both. Among long-term ACS, the adjusted odds of SCD were more than twice higher (AOR 2.18 [95%CI 1.14–4.19]) for those who received FCI and no TS compared to those who received them both.

Conclusion The present study results emphasize the importance of ACS receiving SCP. Adult cancer survivors may highly benefit from the receipt of SCP not only short-term but also long-term for their overall psychological well-being.

Keywords Cancer survivors · Depression · Survivorship care plan · Follow-up care instructions · Treatment summary

Introduction

As of January 1, 2014, there were approximately 14.5 million cancer survivors living in the USA [1]. The development in cancer diagnosis and treatment resulted in an approximately 22 % decline in the overall cancer death rate in the last decade in the USA [2, 3]. The current 5-year survival rate from all cancers is 68 %, a significant increase from 49 % in 1975–1977 [1].

Survivorship Care Plans (SCP), which include follow-up care instructions (FCI) and treatment summaries (TS), are important for cancer survivors to prevent, manage, and treat any long-term/late health related complications due to their cancer history. Follow-up care instructions (FCI) include information pertaining to the timing and location where cancer survivors are to receive their follow-up and primary preventive care, surveillance for recurrence or spread of previous cancer, and possible late/long-term effects due to cancer and its treatment. Treatment summaries (TS) include an explanation of cancer diagnosis, dates of treatment, and treatment description [4]. Cancer TS could increase the survivors' awareness of the received treatment complexity, while FCI would inform and guide the survivors to the best health care providers for follow-up care. The Institute of Medicine's report in 2005

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[5], followed by a second one in 2008 [6], recognized the need of a SCP for better communication between the oncologist(s), the patient, and the primary care provider(s) to improve the quality of health care received during the survivorship continuum.

Prior research has shown that a significant percentage of cancer survivors are at increased risk of psychological sequelae [7–10], such as depression, anxiety, overall psychological distress, and post-traumatic stress disorder. These sequelae, if left untreated, can lead to reduced quality of life, suicide ideation, and increased cancer mortality [11–13]. The Institute of Medicine has emphasized the need of care not only for the physical health of cancer survivors but also for their psychological health [5, 6]. Thus, it is essential to evaluate health care strategies that could significantly reduce the level of these problems among cancer survivors.

One of the recommended public health strategies to improve cancer survivors' follow-up care is the receipt of SCP, which includes the receipt of TS and FCI [5, 14, 15]. A recent study has reported a positive association between receiving TS, FCI, and survivors' receipt of general follow-up health care [16].

While the value of psychosocial interventions on alleviating psychological distress in cancer survivors has been already evaluated [17, 18], and the association between the receipt of SCP and cancer-specific distress has been examined among Canadian breast cancer survivors [19], to the best of our knowledge, there are no published studies that examined the association between the receipt of SCP and psychological distress in U.S. cancer survivors. Understanding the association between SCP and psychological distress may further highlight the need and importance of SCP for U.S. cancer survivors, especially in the first 5 years after completion of cancer treatment as 70 % of them survive this time period. Survivorship care plans should be evaluated as their implementation may help to significantly reduce psychological distress in cancer survivors.

Therefore, the goal of our study was to examine the association between the receipt of SCP and psychological distress among U.S. adult cancer survivors who have completed their cancer treatment. We hypothesize that the receipt of SCP would decrease the likelihood of psychological distress in adult cancer survivors.

Methods

Study design and population

The Behavioral Risk Factor Surveillance System (BRFSS) is the world's largest health related telephone survey, conducted in all 50 U.S. states, the District of Columbia, the U.S. Virgin Islands, Puerto Rico, and Guam. The BRFSS is a federally funded annual survey, collecting information regarding health conditions, health-related behavioral risk factors associated with injuries, infectious diseases and preventable chronic diseases, among randomly selected and interviewed non-institutionalized adults aged 18 years or older [20]. Details regarding the BRFSS study design, sample selection, weighting procedure, and reliability and validity of the measures used have been previously described [21, 22].

Data from the 2010 BRFSS were used for the current study. In the 2010 BRFSS, six states administered both, the "Anxiety and Depression" and the "Cancer Survivorship" optional modules: Indiana, Massachusetts, Missouri, New Jersey, Ohio, and Wisconsin.

Cancer survivors

In order to identify cancer survivors (CS), respondents to the 2010 BRFSS survey from the 6 states that administered both, the "Cancer Survivorship" and the "Anxiety and Depression" modules, were asked if they have ever been told by a doctor, nurse, or other health professional that they had cancer. Those who answered "Yes" to this question were identified as CS and were further asked at what age they were first diagnosed with cancer. The duration of cancer survivorship was computed by subtracting from the age of the respondent at the time of the survey the age at which he/she was first diagnosed with cancer. This duration was further categorized as <1 year, 1–5 years, and >5 years. Survey respondents were also asked if they were currently receiving treatment for cancer. Only CS not currently on cancer treatment were included in the analyses. Those CS whose computed time from cancer diagnoses was <1 year and declared that they were not currently on cancer treatment were excluded from the analyses, since it was not clear from the survey if cancer treatment was even initiated after cancer diagnosis and prior to them participating in the BRFSS survey.

Exposures of interest: receipt of SCP

Receipt of TS or FCI was determined if respondents to the Cancer Survivorship Module answered "Yes" to the question "Did any doctor, nurse, or other health professional EVER give you a written summary of all the cancer treatments that you received?" or "Have you ever received instructions from a doctor, nurse, or other health professional about *where* you should return or *who* you should see for routine cancer check-ups after completing treatment for cancer?", respectively. To test for the association between the combined effect of TS and FCI and the outcome of interest, a combined exposure variable has been created: TS + FCI.

Outcome of interest: symptoms of current depression

Symptoms of current depression (SCD) were assessed among the respondents to the Anxiety and Depression Module by using the eight-item Patient Health Questionnaire-8 (PHQ-8) diagnostic algorithm [23]. There are 8 questions being asked, with 3 possible, mutually exclusive, answers for each, scored from 0 to 2. The sum of all scores is being calculated, obtaining a final PHQ-8 score which can range from 0 to 24. Respondents whose final score was ≥10 were classified as having current depression. The PHQ-8 is a standardized and proven valid measure for diagnostic and severity of distress not only in clinical populations [24, 25] but also in large, population-based surveys [23].

Covariates of interest

Prior research has shown that some of the risk factors associated with psychological distress in adult cancer survivors are older age at evaluation, being female, not married, unemployed, having no health insurance, low educational attainment [7, 10, 26], suffering of cancer-related pain [27, 28], and chronic conditions [10, 7].

For our present study, cancer-related pain was determined if respondents to the Cancer Survivorship Module answered "Yes" to the question "Do you currently have physical pain caused by your cancer or cancer treatment?". Socio-demographic variables included were age, gender, race/ethnicity, education employment and marital status. The number of chronic conditions was determined based on how many of the following chronic conditions a respondent indicated to have had or have: arthritis, asthma, coronary heart disease, diabetes, heart attack, and stroke. Income was not included as a covariate of interest since approximately 15 % of our final study sample had corresponding missing information regarding this variable.

Final study sample

There were 38,646 potentially eligible individuals for this study, who answered the 2010 BRFSS questionnaire, and the "Cancer Survivorship" and "Anxiety and Depression" modules (Fig. 1). Out of them, 4885 were identified as CS, and furthermore, 4565 were identified as adult cancer survivors who were diagnosed with cancer when they were older than 18 years of age, who were not pregnant at the time of the

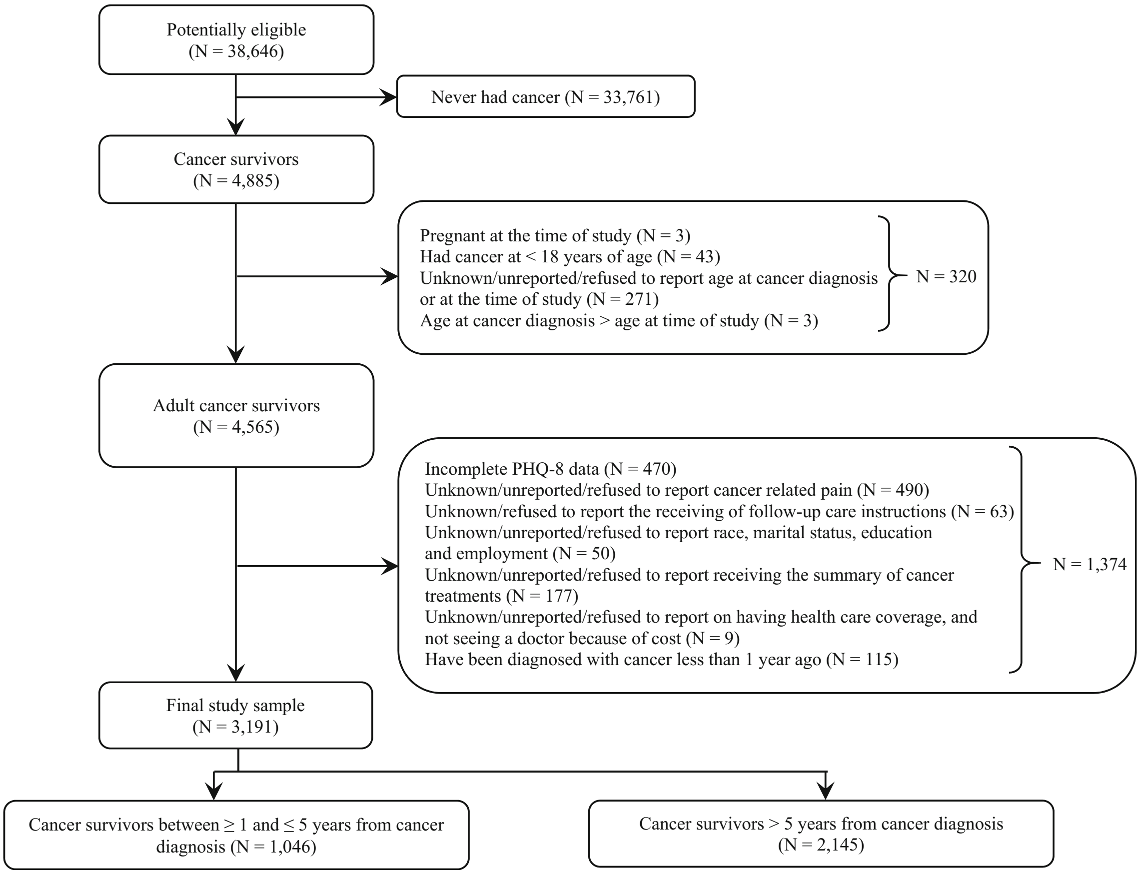

Fig. 1 Analysis specific consort diagram

study, and who reported their age at the time of study to be greater than their age at cancer diagnosis. Among these adult CS, 470 (10.3 %) had incomplete PHQ-8 data, 240 (5.3 %) had missing information about receiving FCI and TS, 490 (10.7 %) has missing values regarding cancer-related pain, 59 (1.3 %) had missing values for race, marital status, education, employment and health care coverage, and 115 (2.5 %) individuals were diagnosed with cancer less than 1 year prior to the study date. Therefore, the final study sample size was 3191, which was comprised of 1046 (32.78 %) adult CS who have been diagnosed with cancer 1 to 5 years (inclusive) prior to the study, and 2145 (67.22 %) adult CS who were diagnosed with cancer more than 5 years prior to the study. None of the individuals in the final study sample were currently under cancer treatment.

Statistical analyses

From the initial group of the potentially eligible participants to this study, respondents who refused to answer, answered "do not know/not sure", or had missing values for any of the study variables, were excluded from the study. Descriptive statistics were produced including weighted prevalence and 95 % confidence intervals (CI) for categorical and ordinal variables, and weighted median and interquartile range for continuous variables. Three multivariable weighted logistic regression models were conducted in order to investigate the association between the receipt of TS, FCI, the combined TS + FCI, and current depression. All three models were conducted in unadjusted and then in adjusted format, among two different groups of CS: those who were less than 5 years from cancer diagnosis, and those who were more than 5 years from cancer diagnosis, at the moment of the survey. All of the statistical analyses were performed using SAS v9.4 (SAS Institute, Cary, NC, USA) using SAS survey procedures (PROC SURVEYMEANS, PROC SUVEYFREQ, PROC SURVEYLOGISTIC) in order to account for the complex sampling design. Statistical significance was set at $p < 0.05$.

Results

Study sample

The characteristics of the study sample are presented in Tables 1 and 2. Among CS diagnosed with cancer 1 to 5 years prior to the study, CS with SCD compared to CS without SCD were significantly younger (median 52 years of age vs. 60 years of age), not married (60.24 vs. 28.97 %), less college educated (14.43 vs. 36.05 %), less employed or self-employed (18.79 vs. 46.32 %), of higher proportion currently suffering of physical pain due to cancer and its treatment (39.49 vs. 9.28 %), and of higher proportion having one or more chronic conditions (68.38 vs. 36.95 %). Among CS diagnosed with cancer more than 5 years prior to the study, CS with SCD compared to CS without SCD were also significantly younger (median 54 years of age vs. 66 years of age), not married (48.16 vs. 32.76 %), less college educated (11.02 vs. 40.47 %), more unable to work or out of work (46.62 vs. 7.46 %), more non-White or Hispanic (17.51 vs. 6.48 %), of higher proportion currently suffering of physical pain due to cancer and its treatment (21.14 vs. 5.39 %), and of higher proportion having one or more chronic conditions (66.85 vs. 43.07 %).

Treatment summaries and follow-up care instructions

The proportion of cancer survivors who received FCI was 75 and 66 %, and who received TS was 35 % and 29 %, among survivors diagnosed within 5 years or more than 5 years from the time of the survey, respectively. Only 32.5 % and 25.1 % of cancer survivors received both, FCI and TSI, among survivors diagnosed within 5 years or more than 5 years from the time of the survey, respectively.

Prevalence of current distress

In the final study sample, the percentage of cancer survivors who reported SCD (PHQ-8 score ≥ 10) was 10.8 % among survivors diagnosed with cancer within 1 to 5 years prior to the study, and 10.1 % among survivors diagnosed with cancer more than 5 years prior to the study.

Model based unadjusted and adjusted odds ratios

Table 3 presents the weighted unadjusted and adjusted odds ratios (UOR and AOR) and corresponding 95 % CI for models investigating the association between the receipt of follow-up care instructions and treatment summaries, individually or in combination, with SCD among CS within 1 to 5 years, and then separately for more than 5 years, from cancer diagnosis.

Among CS within 1 to 5 years from cancer diagnosis, after adjusting for socio-demographic factors, cancer-related pain, and number of chronic conditions, not receiving FCI was significantly associated with an increase in SCD (AOR 2.27 [95 % CI 1.15–4.45]), while not receiving TS was not significantly associated with SCD (AOR 1.88 [95 % CI 0.90–3.93]). Not receiving both, FCI + TS, was significantly associated with an increase in SCD when compared to CS receiving both, FCI + TS (AOR 3.14 [95 % CI 1.29–7.65]).

Among CS more than 5 years from cancer diagnosis, after adjusting for socio-demographic factors, cancer-related pain, and number of chronic conditions, not receiving FCI was not significantly associated with SCD (AOR 0.97 [95 % CI 0.57–1.65]), while not receiving TS was significantly associated with an increase in SCD (AOR 1.86 [95 % CI 1.05–3.29]).

Table 1 Characteristics of cancer survivors between 1 and 5 years from cancer diagnosis, overall and by current depression status ($N = 1046$)

	Cancer survivors ≥ 1 to ≤ 5 years from cancer diagnosis			Symptoms of current depression among cancer survivors ≥ 1 to ≤ 5 years from cancer diagnosis				*p* value
	Unweighted counts			NO (PHQ8 score < 10) ($N = 933$)		Yes (PHQ8 score ≥ 10) ($N = 113$)		
		Weighted		Weighted		Weighted		
Characteristic	($N = 1046$)	Median	Interquartile range	Median	Interquartile range	Median	Interquartile range	
Age at survey (years)	1046	58.85	46.16–69.05	59.8	47.22–70.22	51.99	41.88–61.66	< 0.0001
		Percent	95 % CI for Percent	Percent	95 % CI for Percent	Percent	95 % CI for Percent	
Gender								
Female	610	52.16	47.14–57.18	51.27	46.12–56.42	58.17	40.97–75.36	0.4695
Male	436	47.84	42.82–52.86	48.73	43.58–53.88	41.83	24.64–59.03	
Race								
Non-Hispanic White	938	90.26	87.50–93.03	90.55	88.07–93.04	88.32	74.99–100	0.714
Non-White or Hispanic	108	9.74	6.97–12.50	9.45	6.96–11.94	11.68	0.00–25.01	
Marital status								
Married	574	67	62.40–71.60	71.03	66.74–75.32	39.76	23.51–56.01	0.0002
Separated, divorced or widowed	370	22.42	18.99–25.85	20.79	17.42–24.16	33.44	18.00–48.88	
Never married or member of an unmarried couple	102	10.58	6.70–14.47	8.18	5.17–11.20	26.8	7.86–45.74	
Education								
College graduate or more	327	33.27	28.56–37.97	36.05	30.97–41.13	14.43	7.30–21.56	< 0.0001
Some college or technical school	290	30.41	25.90–34.93	31.17	26.44–35.91	25.28	12.98–37.59	
High School graduate	348	29.82	25.19–34.45	28.32	23.90–32.75	39.97	21.59–58.34	
Less than high school graduate	81	6.5	3.84–9.17	4.46	2.61–6.31	20.32	5.38–35.27	
Employment								
Employed for wages or self-employed	395	42.78	37.91–47.65	46.32	41.32–51.33	18.79	10.71–26.87	< 0.0001
Homemaker or student or retired	511	39.77	35.13–44.40	42.5	37.66–47.34	21.28	13.27–29.29	
Out of work	56	8.38	4.77–11.99	7.38	4.26–10.49	15.15	0.00–32.58	
Unable to work	84	9.07	5.92–12.23	3.8	2.37–5.23	44.78	31.16–58.41	
Have any health care coverage								
Yes	999	92.7	89.80–95.60	92.74	89.53–95.95	92.44	89.66–95.23	0.9255
No	47	7.3	4.40–10.20	7.26	4.05–10.47	7.56	4.77–10.34	
Current physical pain from cancer or treatment								
Yes	114	13.16	9.45–16.87	9.28	5.81–12.73	39.49	24.53–54.45	< 0.0001
No	932	86.84	83.13–90.55	90.73	87.27–94.19	60.51	45.55–75.47	
Number of chronic conditions								
0	533	59	54.16–63.84	63.05	58.34–67.75	31.62	17.15–46.08	< 0.0001
1	315	26.02	21.45–30.58	24.25	19.97–28.53	37.96	20.03–55.89	
2	126	10.84	8.40–13.28	9.95	7.53–12.36	16.88	7.52–26.25	
3	53	3.27	1.86–4.68	2.3	1.26–3.35	9.85	1.33–18.37	
4	14	0.78	0.25–1.31	0.38	0–0.77	3.45	1.39–5.51	
5	5	0.09	0.01–0.18	0.07	0–0.14	0.24	0–0.71	
Received follow-up care instructions								
Yes	789	73.59	68.95–78.23	75.53	71.01–80.06	60.42	44.97–75.86	0.06
No	257	26.41	21.77–31.05	24.47	19.94–28.99	39.58	24.14–55.03	
Received treatment summaries								
Yes	366	31.92	27.16–36.68	32.92	27.84–38.01	25.15	12.59–37.71	0.2945
No	680	68.08	63.32–72.84	67.08	61.99–72.16	74.85	62.29–87.41	

Table 2 Characteristics of cancer survivors more than 5 years from cancer diagnosis, by current depression status (N = 2145)

Characteristic	Cancer survivors >5 years from cancer diagnosis			Symptoms of current depression among cancer survivors >5 years from cancer diagnosis				p value
	Unweighted counts			NO (PHQ8 score < 10) (N = 1929)		Yes (PHQ8 score $\geq$ 10) (N = 216)		
		Weighted		Weighted		Weighted		
	(N = 2145)	Median	Interquartile range	Median	Interquartile range	Median	Interquartile range	
Age at survey (years)	2145	64.52	62.24–64.21	65.87	64.47–67.27	53.26	41.11–61.12	< 0.0001
		Percent	95 % CI for Percent	Percent	95 % CI for Percent	Percent	95 % CI for Percent	
Gender								
Female	1463	61.69	58.24–65.13	60.4	56.81–63.99	70.54	60.77–80.32	0.103
Male	682	38.31	34.87–41.76	39.6	36.01–43.19	29.46	19.68–39.23	
Race								
Non-Hispanic White	1929	92.12	90.20–94.05	93.52	92.05–94.99	82.49	73.19–91.79	0.0016
Non-White or Hispanic	216	7.88	5.95–9.80	6.48	5.01–7.95	17.51	8.21–26.81	
Marital status								
Married	1089	65.28	62.14–68.43	67.24	64.01–70.46	51.84	41.62–62.06	0.025
Separated, divorced or widowed	881	28.19	25.22–31.15	26.59	23.70–29.48	39.21	27.71–50.71	
Never married or member of an unmarried couple	175	6.53	4.70–8.36	6.17	4.29–8.06	8.95	3.02–14.88	
Education								
College graduate or more	690	36.74	33.27–40.21	40.47	36.76–44.19	11.02	6.46–15.58	< 0.0001
Some college or technical school	573	23.66	20.85–26.46	22.43	19.57–25.30	32.06	22.19–41.93	
High school graduate	709	31.85	28.58–35.11	31.61	28.22–35.00	33.51	24.66–42.37	
Less than high school graduate	173	7.75	5.62–9.89	5.49	4.02–6.95	23.41	11.13–35.69	
Employment								
Employed for wages or self-employed	654	38.02	34.38–41.66	39.55	35.70–43.40	27.47	16.81–38.13	< 0.0001
Homemaker or student or retired	1223	49.56	46.06–53.07	52.99	49.21–56.77	25.91	18.83–32.98	
Out of work	88	4.74	3.03–6.45	3.65	2.12–5.18	12.22	5.65–18.80	
Unable to work	180	7.68	5.78–9.58	3.81	2.56–5.05	34.4	25.70–43.10	
Have any health care coverage								
Yes	2055	94.13	92.01–96.24	95.71	93.98–97.43	83.24	71.71–94.77	0.0004
No	90	5.87	3.76–7.99	4.29	2.57–6.02	16.76	5.23–28.29	
Current physical pain from cancer or treatment								
Yes	140	7.39	5.43–9.35	5.39	3.47–7.31	21.14	12.97–29.31	< 0.0001
No	2005	92.61	90.65–94.58	94.61	92.69–96.53	78.86	70.69–87.03	
Number of chronic conditions								
0	991	53.92	50.43–57.41	56.93	53.33–60.54	33.15	22.47–43.83	< 0.0001
1	686	29.55	26.27–32.82	28.59	25.25–31.93	36.15	25.19–47.11	
2	303	11.85	9.88–13.82	11.29	9.21–13.35	15.72	10.39–21.05	
3	104	3.03	2.08–3.98	2.11	1.45–2.77	9.38	5.57–13.20	
4	44	1.17	0.52–1.84	0.68	0.35–1.01	4.6	1.47–7.72	
5	17	0.48	0.16–0.80	0.4	0.07–0.74	1	0–2.02	
Received follow-up care instructions								
Yes	1424	68.13	64.90–71.36	68.21	64.88–71.53	67.6	56.21–78.98	0.9196
No	721	31.87	28.64–35.10	31.79	28.47–35.12	32.4	21.02–43.79	
Received treatment summaries								
Yes	611	29.66	26.32–33.00	30.24	26.74–33.75	25.64	16.56–34.72	0.406
No	1534	70.34	67.00–73.68	69.76	66.25–73.26	74.36	65.28–83.44	

Table 3 Unadjusted and adjusted odds ratio and 95 % CI for receipt of follow-up care instructions and treatment summaries, individually and combined, in association with symptoms of current depression

	Symptoms of current depression among cancer survivors ≥1 and ≤5 years from cancer diagnosis (N = 1046)			Symptoms of current depression among cancer survivors >5 years from cancer diagnosis (N = 2145)		
	Unweighted counts	UOR (95 % CI)	AOR (95 % CI)	Unweighted counts	UOR (95 % CI)	AOR (95 % CI)
Received follow-up care instructions						
Yes	789	Reference	Reference	1424	Reference	Reference
No	257	2.02 (0.95–4.30)	*2.27 (1.15–4.45)*	721	1.03 (0.60–1.77)	0.97 (0.57–1.65)
Received treatment summaries						
Yes	366	Reference	Reference	611	Reference	Reference
No	680	1.46 (0.71–2.99)	1.88 (0.90–3.93)	1534	1.26 (0.73–2.16)	*1.86 (1.05–3.29)*
Received follow-up care instructions + treatment summaries						
Yes + Yes	340	Reference	Reference	538	Reference	Reference
Yes + No	449	1.11 (0.49–2.49)	1.52 (0.66–3.50)	886	1.25 (0.69–2.27)	*2.18 (1.14–4.19)*
No + Yes	26	1.28 (0.33–4.96)	1.45 (0.22–9.52)	73	0.87 (0.29–2.60)	1.68 (0.43–6.54)
No + No	231	2.22 (0.90–5.51)	*3.14 (1.29–7.65)*	648	1.22 (0.60–2.47)	1.60 (0.80–3.19)

Adjusted model for: age, sex, race, marital status, education level, employment level, health care plan, cancer-related pain and number of chronic conditions

UOR unadjusted odds ratio, *AOR* adjusted odds ratio. Italic: significantly different from 1 at 0.05 level

When investigating the association between SCD and the combination of FCI + TS, receiving just the FCI and not the TS was significantly associated with an increase in SCD (AOR 2.18 [95 % CI 1.14–4.19]).

Discussion

Five-years post cancer diagnosis is a very important "milestone" in the life of every cancer survivor [29], as it represents the end of a period of high risk for cancer recurrence and the beginning of a lower risk period [30, 31]. To our knowledge, the current study is the first to investigate the association between the receipt of SCP and SCD during the two very important time intervals in the survivorship continuum, less than (short-term) and more than (long-term) 5 years from cancer diagnosis [32, 33].

Within the first 5-years after cancer diagnosis, the lack of receiving FCI was significantly associated with increased odds of SCD among cancer survivors when compared to cancer survivors who did receive FCI. Also, the lack of receiving both, FCI and TS, was significantly associated with increased odds of SCD in cancer survivors, when compared to those who received them both. The fear of cancer recurrence among cancer survivors is very high during the first 5 years after cancer diagnosis [34, 35]. Therefore, it is very important for cancer survivors to receive the correct follow-up care during this very critical time period in their survivorship continuum, including psychological interventions which could reduce their SCD. Prior research has shown that the receipt of FCI and TS is independently and in combination associated with cancer survivor's receipt of follow-up health care [16, 36]. Follow-up health care includes psychological interventions which have already been proven to be not only effective, but also economical among cancer survivors [17, 37]. The results of the present study show that the receipt of a SCP for short-term cancer survivors could significantly reduce their SCD.

The present study results have also shown that within the first 5 years after cancer diagnosis, the receipt of TS without receiving FCI was not significantly associated with SCD among cancer survivors. One possible explanation for this finding is the fact that only 2.5 % of all short-term cancer survivors received TS without receiving FCI, and therefore, the numbers are too low to draw a statistically significant conclusion for this subgroup of survivors.

After 5-years from cancer diagnosis, among cancer survivors, the lack of receiving TS increased the odds of SCD by almost twice when compared to those survivors actually receiving TS. Even more, survivors who did receive FCI without receiving TS had more than twice increased the odds of SCD when compared to survivors who received them both. On the other hand, the association between FCI and SCD lost its statistical significance.

Long-term cancer survivors have the experience of cancer survivorship and follow-up care, which may explain the null association between FCI and SCD. While the purpose of TS is to better facilitate the communication between their primary care providers and their cancer treatment centers, and the value of receiving TS has been priory emphasized [38, 39], to our knowledge, there is no published research investigating the value of FCI in the absence of TS, especially among long-term cancer survivors. Even though cancer survivors try hard to forget their cancer experience [40], long-term cancer survivors still face low or moderate levels of fear of cancer recurrence [41]. In the absence of TS, long-term cancer survivors may face difficulties in remembering their detailed cancer diagnosis and treatment [42]. Therefore, cancer survivors who do receive FCI may face difficulties in communicating their cancer diagnosis and treatment history to their primary care providers, which could in turn lead to frustration, lack of receiving timely follow-up care for their medical needs, and as a result, an increase in their SCD. The results of the present study show that the receipt of a TS for long-term cancer survivors could significantly reduce their SCD.

The present study results have certain limitations. First, the subgroup of cancer survivors who did not receive FCI but did receive TS is underrepresented in our study sample, since only 2.5 % of short-term and 3.4 % of long-term cancer survivors fell in that category. Second, even though cancer-related pain and the number of comorbid conditions was accounted for, the effect of the severity of the pain and conditions on SCD could not be assessed. Third, since the BRFSS is a phone survey answered by each individual participant, the answers to some of the questions may be subject to recall bias. Fourth, PHQ-8 is not equivalent to a clinical diagnosis of depression. PHQ-8 is a survey tool used to screen for depression and as such further assessment by a clinician is required to actually clinically diagnose an individual with depression. The individuals reporting PHQ-8 symptoms of depression may have other factors that influenced their self-assessment of symptoms, such as no longer working, fear of recurrence, family issues. Therefore, the use of PHQ-8 may lead to an overestimation of the prevalence of depression.

There are obstacles that have been identified in implementing the SCP [43, 44], and not all cancer survivors receive TS and/or FCI [45, 46]. The current study found that even though the majority of short-term and long-term cancer survivors did receive FCI, only a minority of them received TS. Despite these limitations, the present results show that while the receipt of a SCP plays an important role on SCD among short-term cancer survivors, TS have a significant impact on SCD among long-term cancer survivors. Survivorship care plans need be effective not only in the short term but also in the long term, since cancer survivors need to fully benefit from cancer follow-up health care, including managing possible symptoms of psychological distress, for the rest of their lives. Both FCI and TS play a very important role in the survivorship continuum and their receipt is essential for the short- and long-term psychological well-being of cancer survivors.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Research involving human participants and/or animals This article does not contain any studies with animals performed by any of the authors.

The BRFSS 2010 survey data used in this study is publicly available and de-identified. The BRFSS Cell Phone Project Operational Protocol can be found at: http://www.ndhealth.gov/brfss/image/cache/2010_BRFSS_Cell_Phone_Project_Opeartional_Protocol.pdf.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and /or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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References

1. American Cancer Society: Cancer Facts & Figures 2015. Atlanta, GA. Atlanta, Georgia 2015. http://www.cancer.org/acs/groups/content/@editorial/documents/document/acspc-044552.pdf
2. Parry C, Kent EE, Mariotto AB, Alfano CM, Rowland JH (2011) Cancer survivors: a booming population. Cancer Epidemiol Biomark Prev 20(10):1996–2005. doi:10.1158/1055-9965.EPI-11-0729
3. Siegel RL, Miller KD, Jemal A (2015) Cancer statistics, 2015. CA Cancer J Clin 65(1):5–29. doi:10.3322/caac.21254
4. American Society of Clinical Oncology (ASCO). Survivorship Care Clinical Tools and Resources 2015. http://www.asco.org/practice-research/survivorship-care-clinical-tools-and-resources
5. Hewitt M, Greenfield S, Stovall E (2005) Institute of Medicine and National Research Council of the National Academies. From cancer patient to cancer survivor: lost in transition. The National Academies Press, Washington, DC
6. Adler NE, Page AEK, Institute of Medicine (IOM) (eds) (2008) Cancer care for the whole patient: meeting psychosocial health needs. The National Academies Collection: reports funded by National Institutes of Health. The National Academies Press, Washington, DC
7. Hoffman KE, McCarthy EP, Recklitis CJ, Ng AK (2009) Psychological distress in long-term survivors of adult-onset cancer: results from a national survey. Arch Intern Med 169(14):1274–1281. doi:10.1001/archinternmed.2009.179
8. Lynch BM, Steginga SK, Hawkes AL, Pakenham KI, Dunn J (2008) Describing and predicting psychological distress after colorectal cancer. Cancer 112(6):1363–1370. doi:10.1002/cncr.23300
9. Dahl AA, Haaland CF, Mykletun A, Bremnes R, Dahl O, Klepp O, et al. (2005) Study of anxiety disorder and depression in long-term survivors of testicular cancer. J Clin Oncol 23(10):2389–2395. doi:10.1200/JCO.2005.05.061
10. Zhao G, Okoro CA, Li J, White A, Dhingra S, Li C (2014) Current depression among adult cancer survivors: findings from the 2010 Behavioral Risk Factor Surveillance System. Cancer Epidemiol 38(6):757–764. doi:10.1016/j.canep.2014.10.002
11. Brinkman TM, Zhang N, Recklitis CJ, Kimberg C, Zeltzer LK, Muriel AC, et al. (2014) Suicide ideation and associated mortality in adult survivors of childhood cancer. Cancer 120(2):271–277. doi:10.1002/cncr.28385
12. Hamer M, Chida Y, Molloy GJ (2009) Psychological distress and cancer mortality. J Psychosom Res 66(3):255–258. doi:10.1016/j.jpsychores.2008.11.002

13. Mehnert A, Koch U (2008) Psychological comorbidity and health-related quality of life and its association with awareness, utilization, and need for psychosocial support in a cancer register-based sample of long-term breast cancer survivors. J Psychosom Res 64(4):383–391. doi:10.1016/j.jpsychores.2007.12.005
14. Earle CC (2007) Long term care planning for cancer survivors: a health services research agenda. J Cancer Surviv 1(1):64–74. doi:10.1007/s11764-006-0003-9
15. Reuben SH (2004) Living beyond cancer: finding a new balance, President's cancer panel 2003–2004 annual report. National Cancer Institute, Bethesda, MD
16. Jabson JM (2015) Follow-up care instructions, treatment summaries, and cancer survivors' receipt of follow-up health care and late/long term effects. Support Care Cancer 23(7):1851–1856. doi:10.1007/s00520-014-2532-5
17. Gordon LG, Beesley VL, Scuffham PA (2011) Evidence on the economic value of psychosocial interventions to alleviate anxiety and depression among cancer survivors: a systematic review. Asia Pac J Clin Oncol 7(2):96–105. doi:10.1111/j.1743-7563.2011.01395.x
18. van der Spek N, Vos J, van Uden-Kraan CF, Breitbart W, Cuijpers P, Knipscheer-Kuipers K, et al. (2014) Effectiveness and cost-effectiveness of meaning-centered group psychotherapy in cancer survivors: protocol of a randomized controlled trial. BMC Psychiatry 14:22. doi:10.1186/1471-244X-14-22
19. Grunfeld E, Julian JA, Pond G, Maunsell E, Coyle D, Folkes A, et al. (2011) Evaluating survivorship care plans: results of a randomized, clinical trial of patients with breast cancer. J Clin Oncol 29(36):4755–4762. doi:10.1200/JCO.2011.36.8373
20. CDC. Health risks in the United States. Behavioral Risk Factor Surveillance System: at a glance 2010. US Department of Health and Human Services, CDC, Atlanta, GA. 2010. stacks.cdc.gov/view/cdc/11797/cdc_11797_DS1.pdf. Accessed 25 Sept 2015
21. CDC. Overview: BRFSS 2010. http://www.cdc.gov/brfss/annual_data/2010/pdf/overview_10.pdf. Accessed 25 Sept 2015
22. Nelson DE, Holtzman D, Bolen J, Stanwyck CA, Mack KA (2001) Reliability and validity of measures from the Behavioral Risk Factor Surveillance System (BRFSS). Soz Praventivmed 46(Suppl 1):S3–42
23. Kroenke K, Strine TW, Spitzer RL, Williams JB, Berry JT, Mokdad AH (2009) The PHQ-8 as a measure of current depression in the general population. J Affect Disord 114(1–3):163–173. doi:10.1016/j.jad.2008.06.026
24. Kroenke K, Spitzer RL, Williams JB (2001) The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med 16(9):606–613
25. Kroenke K, Spitzer RL (2002) The PHQ-9: a new depression diagnostic and severity measure. Psychiatr Ann 32(9):1–7
26. Zeltzer LK, Lu Q, Leisenring W, Tsao JC, Recklitis C, Armstrong G, et al. (2008) Psychosocial outcomes and health-related quality of life in adult childhood cancer survivors: a report from the childhood cancer survivor study. Cancer Epidemiol Biomark Prev 17(2):435–446. doi:10.1158/1055-9965.EPI-07-2541
27. Green CR, Hart-Johnson T, Loeffler DR (2011) Cancer-related chronic pain: examining quality of life in diverse cancer survivors. Cancer 117(9):1994–2003. doi:10.1002/cncr.25761
28. Oancea SC, Brinkman TM, Ness KK, Krull KR, Smith WA, Srivastava DK, et al. (2014) Emotional distress among adult survivors of childhood cancer. J Cancer Surviv 8(2):293–303. doi:10.1007/s11764-013-0336-0
29. American Cancer Society. When cancer comes back: cancer recurrence. 2013. http://www.cancer.org/acs/groups/cid/documents/webcontent/002947-pdf.pdf
30. Aziz NM, Rowland JH (2003) Trends and advances in cancer survivorship research: challenge and opportunity. Semin Radiat Oncol 13(3):248–266. doi:10.1016/S1053-4296(03)00024-9
31. Bloom JR, Stewart SL, D'Onofrio CN, Luce J, Banks PJ (2008) Addressing the needs of young breast cancer survivors at the 5 year milestone: can a short-term, low intensity intervention produce change? J Cancer Surviv 2(3):190–204. doi:10.1007/s11764-008-0058-x
32. Mullan F (1985) Seasons of survival: reflections of a physician with cancer. N Engl J Med 313(4):270–273. doi:10.1056/NEJM198507253130421
33. Aziz NM (2007) Cancer survivorship research: state of knowledge, challenges and opportunities. Acta Oncol 46(4):417–432. doi:10.1080/02841860701367878
34. American Cancer Society. Living with uncertainty: the fear of cancer recurrence. 2013. http://www.cancer.org/acs/groups/cid/documents/webcontent/002014-pdf.pdf. 2015
35. Simard S, Thewes B, Humphris G, Dixon M, Hayden C, Mireskandari S, et al. (2013) Fear of cancer recurrence in adult cancer survivors: a systematic review of quantitative studies. J Cancer Surviv 7(3):300–322. doi:10.1007/s11764-013-0272-z
36. Jabson JM (2015) Treatment summaries, follow-up care instructions, and patient navigation: could they be combined to improve cancer survivor's receipt of follow-up care? J Cancer Surviv 9(4):692–698. doi:10.1007/s11764-015-0444-0
37. Stagl JM, Antoni MH, Lechner SC, Bouchard LC, Blomberg BB, Gluck S, et al. (2015) Randomized controlled trial of cognitive behavioral stress management in breast cancer: a brief report of effects on 5-year depressive symptoms. Health Psychol 34(2):176–180. doi:10.1037/hea0000125
38. Hayman JA (2009) Treatment summaries in radiation oncology and their role in improving patients' quality of care: past, present, and future. J Oncol Pract 5(3):108–109. doi:10.1200/JOP.0934404
39. Rechis R, Beckjord EB, Nutt S (2014) Potential benefits of treatment summaries for survivors' health and information needs: results from a LIVESTRONG survey. J Oncol Pract 10(1):75–78. doi:10.1200/JOP.2013.000973
40. Spiegel D, Gautier H, Fobair P (2007) Everyone's guide to cancer survivorship: a road map for better health. Andrews McMeel Publishing, Kansas city
41. Koch L, Jansen L, Brenner H, Arndt V (2013) Fear of recurrence and disease progression in long-term (>/= 5 years) cancer survivors—a systematic review of quantitative studies. Psycho-Oncology 22(1):1–11. doi:10.1002/pon.3022
42. Nissen MJ, Tsai ML, Blaes AH, Swenson KK (2012) Breast and colorectal cancer survivors' knowledge about their diagnosis and treatment. J Cancer Surviv 6(1):20–32. doi:10.1007/s11764-011-0189-3
43. Birken SA, Deal AM, Mayer DK, Weiner BJ (2014) Following through: the consistency of survivorship care plan use in United States cancer programs. J Cancer Educ 29(4):689–697. doi:10.1007/s13187-014-0628-8
44. Birken SA, Deal AM, Mayer DK, Weiner BJ (2014) Determinants of survivorship care plan use in US cancer programs. J Cancer Educ 29(4):720–727. doi:10.1007/s13187-014-0645-7
45. Underwood JM, Townsend JS, Stewart SL, Buchannan N, Ekwueme DU, Hawkins NA, et al. (2012) Surveillance of demographic characteristics and health behaviors among adult cancer survivors—Behavioral Risk Factor Surveillance System, United States, 2009. MMWR Surveill Summ 61(1):1–23
46. Sabatino SA, Thompson TD, Smith JL, Rowland JH, Forsythe LP, Pollack L, et al. (2013) Receipt of cancer treatment summaries and follow-up instructions among adult cancer survivors: results from a national survey. J Cancer Surviv 7(1):32–43. doi:10.1007/s11764-012-0242-x