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Fear of cancer recurrence among survivors of childhood cancer

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Abstract

Objectives: Fear of cancer recurrence (FCR) has not been widely explored in survivors of childhood cancer. Yet, childhood survivors are at risk of experiencing late effects and may be especially vulnerable. The aims of the current study were to conduct a retrospective chart review to determine the prevalence and persistence of FCR among survivors of childhood cancer and to examine factors that may be related to FCR.

Methods: Survivors of childhood cancer (n = 228, mean attained age = 14.5 years [range = 4.7-21 years]; mean diagnosis age = 4.4 years [range = 0-16.5 years]; mean time off treatment = 8.7 years [range = 2.8-19.3 years]) seen in a Long-Term Survivor Clinic (LTSC) completed questionnaires at each clinic visit detailing their current health. FCR was measured with a single item. Data from questionnaires from 2011 to 2018 were analyzed retrospectively. Descriptive statistics and a random effects model were used to address study aims.

Results: FCR was reported in 43% (n = 98) of survivors at least once across all clinic visits. Among survivors reporting FCR at least once, 66% were diagnosed with cancer under the age of 5, and 64% were 13 years or older at their most recent follow-up. Twenty-one percent of survivors (n = 48/224) reported FCR during at least 50% of their visits. Survivors with a higher number of depressive symptoms were more likely to report FCR (OR = 1.66, P = .03).

Conclusions: FCR is prevalent among survivors of childhood cancer and is related to other health concerns. Research is needed to understand who is at risk and how to.

KEYWORDS

cancer, fear of cancer recurrence, late effects, oncology, pediatric, survivorship

1 | BACKGROUND

Due to medical advances in cancer therapy, treatment, and increased surveillance and management of treatment-related complications, the 5-year survival rate for pediatric cancer has increased from 58% to 83% in the United States over the past several decades. As a result, the population of long-term survivors of childhood cancer is rapidly increasing, and currently, there are estimated to be over 500 000 survivors of pediatric cancer in North America alone. Survivors of childhood cancer face numerous stressors related to their cancer experience and late effects of their treatment. Medical late effects of cancer treatment vary based on diagnosis and treatment received, but may include consequences to the musculoskeletal and cardiovascular systems, impairments in growth and fertility,

secondary malignancies, neurocognitive delays, and social difficulties. In addition to medical late effects, there are also psychological consequences of the cancer experience, which continue to affect survivors long after treatment ends, including anxiety, depression, and posttraumatic stress (PTSS). Given the exponentially increasing population of survivors of childhood cancer, it is imperative to address both the medical and psychological late effects of cancer and its treatment.

A commonly identified concern among survivors of adult cancer is fear of cancer recurrence (FCR), defined as the concern or worry about cancer returning or progressing in the same part of the body or other areas. As survivors are at an increased risk of developing secondary malignancies or relapsing, vigilance toward unusual physical symptoms is recommended as they may serve as important warning signs. However, FCR can become excessive and lead to frequent and unnecessary physical checking, decreased quality of life (QoL), limited planning for the future, and has been associated with other dysfunctional behaviors, including low adherence to physical activity and fruit and vegetable recommendations. Additionally, elevated FCR can lead to increased health-care usage, including increased frequency of unscheduled physician visits, increased medication usage, and reluctance to be discharged from follow-up care. In turn, these behaviors increase health-care system costs.

While the majority of research examining FCR has focused on survivors of adult cancer, with 49% of adult survivors of cancer reporting moderate to high levels of FCR, there is a growing literature investigating this concern among adolescent and young adult (AYA) survivors of cancer. A recent systematic review specific to FCR among AYA survivors found prevalence rates between 31% and 85%. Moreover, resources for managing FCR have been identified as a significant unmet need by both adult and adolescent survivors of cancer, indicating that not only is it a prevalent concern but also survivors are struggling to cope effectively. Greater treatment intensity and psychological distress are associated with higher levels of FCR among AYA survivors. Experiencing more severe physical symptoms in survivorship is also associated with greater FCR, perhaps because these symptoms act as triggers for their concerns or reminders of their diagnosis. In addition, younger age at diagnosis and younger age at the time of study participation are the most consistent predictors of FCR.

Emerging literature is exploring FCR among survivors of pediatric cancer. Among a sample of 404 adult survivors of pediatric cancer who were an average of 19 years since diagnosis and 27 years of age at the time of study, 11% reported no FCR, 79% reported a little, or some fear and 8.7% reported a great deal of fear. We do not yet have an understanding of the prevalence of FCR among an AYA sample of survivors of childhood cancer. Since younger age at diagnosis is a risk factor for FCR, FCR may be especially pertinent for childhood cancer survivors, the majority of whom will experience medical and psychological late effects of their cancer treatments and who will spend a significant portion of their lives as survivors. Moreover, since FCR has been associated with significant psychological distress, and little is known about its prevalence among these young survivors, it is imperative to investigate this potentially damaging concern in AYA survivors of childhood cancer. Therefore, the primary aims of the current study were to: (a) determine the prevalence and persistence of FCR among survivors of childhood cancer at our center by completing a retrospective chart review of survivors of childhood cancer at our institution and examining responses to a single-item measure of FCR; and (b) examine factors that may be related to FCR in this population. We hypothesized that: (a) the prevalence of FCR would be equivalent to that reported by adult cancer survivors; (a) FCR would be persistent (ie, present in >50% of clinic appointments) among a subset of the population; and (c) FCR would be associated with greater health problems (eg, pain, physical symptoms), late effects of treatment (eg, experiencing 2 or more late effects; and experiencing late effects grade 1 or 2 or experiencing late effects grade 3 or higher), and psychological distress (eg, depressive symptoms), as well as harmful health behaviors (ie, smoking, drinking to intoxication and use of street drugs).

2 | METHODS

2.1 | Participants

Participants were survivors enrolled in a Long-Term Survivor Clinic (LTSC) who completed cancer treatment (ie, surgery, chemotherapy, radiation therapy) and were at least 2 years from completion of their therapy. Survivors of pediatric brain tumors receiving only surgery were infrequently followed by this clinic. The majority of participants attended this clinic either once or twice a year relative to the timing of completion of their therapy.

2.2 | Procedure

As part of their routine clinic appointment, all survivors completed the Long-Term Survivor Questionnaire, which assessed their current health status. The questionnaire was mailed prior to clinic appointments for completion either before or at their clinic appointment. Thus, 100% of survivors completed the Long-Term Survivor Questionnaire. Recommendations from the clinic were that questionnaires for survivors <13 years of age be completed by parent-proxy whereas questionnaires for survivors ≥13 years of age be self-report due to the nature of some of the health questions designed for this age range (eg, sexual health). Questionnaire responses were reviewed as part of the clinic visit. Ethics approval was obtained from our local institution (HREBA.CC-16-0972) and conforms to the ethical standards set by the Declaration of Helsinki. We completed retrospective data collection from survivors' medical charts from the period of August 2011 to June 2018. Participants attended an average of four visits to the clinic [range = 1-9 visits] during this time.

2.3 | Measures

2.3.1 | The Long-Term Survivor Questionnaire

The Long-Term Survivor Questionnaire was designed to facilitate communication between the LTSC team, the survivor, and their family. This questionnaire is not standardized and has not been validated. FCR within the Long-Term Survivor Questionnaire is assessed by asking the following question: "Are you concerned about the following health issues: Fear of cancer coming back?" Survivors answered "yes" or "no". In addition to FCR, the questionnaire asks about general health concerns (see Supplementary Table 1 for the wording of questions).

Questions related to health behaviors were only asked of survivors ≥13 years of age.

2.3.2 | Demographic and clinical information

Demographic (ie, gender, age, postal code) and clinical information (ie, diagnosis, treatment, age at diagnosis, and time off treatment) were obtained from each survivors' medical record. Socioeconomic status for each survivor was estimated using the postal code of each survivor and Statistics Canada 2006 Census Data. For survivors living within the City of Calgary, average income was extracted for each individual Calgary Community. Outside the City of Calgary, income for each town was extracted, or by county or census division if these data were not available. This methodology has been demonstrated to be a reliable estimate of socioeconomic status in previous studies. Of our current sample, 17 survivors lived independently. Given postal code may not have been an accurate reflection of these survivors' socioeconomic status, they were removed from analyses including income.

2.3.3 | Late effects

The late effects experienced by each survivor were characterized by the LTSC team according to the Common Terminology Criteria for Adverse Events (CTCAE). CTCAE is used to report on the presence and severity of late and adverse effects. Disorders are grouped by organ systems including musculoskeletal (eg, avascular necrosis, growth suppression), nervous system (eg, concentration impairment, headache), reproductive (eg, azoospermia, premature menopause), and psychiatric systems (eg, anxiety, depression). Severity is classified either grade 1 (mild; asymptomatic or mild symptoms not requiring intervention), grade 2 (moderate; limiting activities of daily living [ADL] and requiring minimal or non-invasive treatment), grade 3 (severe/disabling; severely limiting ADL and requiring significant intervention), grade 4 (life-threatening; urgent intervention is required), or grade 5 (death). The effects were classified based on Hudson et al's modification of the CTCAE v4.03 that increased the applicability of these criteria to childhood cancer survivors. Late effects were operationalized for the purposes of the current study as: experiencing two or more late effects; and experiencing late effects grade 1 or 2 or experiencing late effects grade 3 or higher, which is consistent with other literature.

2.4 | Statistical analyses

Analyses were conducted using IBM SPSS Statistics 25 and STATA SE 15.1. To address our first aim, frequencies were calculated for survivors responding "yes" to concerns about FCR at least once across all clinic visits. Survivors were then grouped by age at follow-up, age at diagnosis, time off treatment, diagnosis, and number of late effects to explore prevalence rates of FCR according to these categories. Prevalence was also explored to examine persistent FCR. Persistent FCR was operationalized as survivors reporting FCR at least 50% of the time across all their visits (for those with two or more clinic visits).

To address our second objective, the relationship between FCR and several variables including demographic, clinical factors (ie, diagnosis type, relapse, time-off treatment), and health concerns (ie, health problems, social problems, depressive symptoms, other fears, and health behaviors) were explored using a random effects model (REM). REM was considered the appropriate analysis given our panel data and its ability to account for repeated-measures correlation when producing coefficient estimates. An exchangeable correlation structure was used to account for the correlated responses over time. The time varying factors that could change at each visit and had multiple records included: FCR; age at follow-up; time-off treatment at follow-up; health problems; headache; chronic pain; feeling tired; sleeping pattern; appetite; depression; sadness; and crying easity. A *P*-value of less than .05 indicated statistical significance for the inferential analyses.

3 | RESULTS

Table displays the descriptive characteristics of our sample. Our sample included 228 survivors with a mean age of 14.5 years (range = 4.7-21 years) at their most recent follow-up visit and a mean age of 4.4 years (range = 0-16.5 years) at diagnosis. Mean time off treatment at the most recent follow-up visit was 8.7 years (range = 2.8-19.3 years). The most common diagnosis in our sample was leukemia (44%), followed by solid tumors (40%), lymphoma (9%), and central nervous system (CNS) tumors (6%). Remaining diagnoses were classified as "other" (0.4%). Among survivors 13 years and older at their latest follow up appointment (n = 149), 21% reported drinking to intoxication, and 8% reported the use of street drugs. Thirty percent of survivors experience late effects that were categorized as Grade 3 or higher.

The prevalence of survivors reporting FCR across all clinic visits is displayed in Table . Overall, 43% (n = 98/228) of survivors reported FCR at least once across all included clinic visits. Of those who indicated FCR at least once, 43.7% were diagnosed with cancer under the age of 5, and 43.0% were 13 years or older at their most recent

TABLE 1 Demographic and clinical characteristics of childhood cancer survivors (n = 228)

Characteristic	Childhood cancer survivors (n = 228)		
	N(%)	Mean (SD)	Median (Range)
Sex			
Male	127 (55.7)		
Female	101 (44.3)		
Age at most recent follow-up (Years)		14.5 (4.1)	15.0 (4.7-21.0)
0-5 years	1 (0.4)		
5-10 years	37 (16.2)		
10-15 years	80 (35.1)		
15-20 years	95 (41.7)		
20-25 years	15 (6.6)		
Age at diagnosis (Years)		4.4 (3.8)	3.05 (0.0-16.5)
0–5 years	151 (66.2)		
5–10 years	55 (24.1)		
10–15 years	18 (7.9)		
15–20 years	4 (1.8)		
Time off treatment at most recent follow-up (Years)		8.7 (3.8)	8.2 (2.8-19.3)
0–5 years	44 (19.3)		
5–10 years	103 (45.2)		
10–15 years	64 (28.1)		
15–20 years	16 (7.0)		
Missing	1 (0.4)		
Number of clinic visits		4.1 (1.9)	4.0 (1-9)
Diagnosis			
Leukemia	101 (44.3)		
Solid Tumor	92 (40.4)		
Lymphoma	20 (8.8)		
CNS	14 (6.1)		
Other	1 (0.4)		
Treatment			
Chemotherapy	216 (94.7)		
Surgery	140 (61.4)		
Radiation	67 (29.4)		
Relapse	14 (6.1)		
Number of late effects experienced		2.0 (1.6)	1.0 (0-7)
Severity of late effects			
Experiencing late effects grade 1 or 2	166 (72.8)		
Experiencing late effects grade 3 or higher	68 (29.8)		
Household income			
<40 000	39 (18.3)		
40 000-79 000	133 (62.4)		
> = 80 000	31 (14.6)		
Unknown	10 (4.7)		
Survivors 13 years and over (n = 149)			
Drinking to intoxication	31 (20.8)		
Smoker/past smoker	5 (3.5)		
Using street Drugs	12 (8.1)		

Note: SD = Standard deviation.

[a]Household income was not included for patients who live independently (n = 17).

TABLE 2 Prevalence rates of FCR by clinical characteristics

Clinical factor	Fear of cancer recurrence ever reported	*P*-value	Persistent fear of cancer recurrence	*P*-value
	n1/n (%)		n2/n (%)	
Sex				
Male	53/127 (41.7)	.67	29/127 (22.8)	.46
Female	45/101 (44.6)		19/101 (18.8)	
Household income				
<40 000	20/39 (51.3)	.56	8/39 (20.5)	.31
40 000-79 000	58/133 (43.6)		28/133 (21.05)	
> = 80 000	17/31 (54.8)		11/31 (35.5)	
Unknown	3/10 (30)		1/10(10)	
Diagnosis				
Leukemia	36/101 (35.6)	.18	18/101 (17.8)	.43
Solid Tumor	46/92 (50.0)		21/92 (22.8)	
Lymphoma	11/20 (55.0)		7/20 (35.0)	
CNS	5/14 (35.7)		2/14 (14.3)	
Other	0/1 (0.0)		0/1 (0.0)	
Treatment				
Chemotherapy	93/216 (43.1)	.93	46/216 (21.3)	.70
Surgery	62/140 (44.3)	.62	31/140 (22.1)	.61
Radiation	29/67 (43.3)	.95	15/67 (22.4)	.75
Relapse	4/14 (28.6)	.26	1/14 (7.1)	.31
Late effects				
Experiencing late effects grade 1 or 2	76/166 (45.8)	.06	39/166 (23.5)	.03
Experiencing late effects grade 3 or higher	32/68 (47.1)	.33	16/68 (23.5)	.41
Age at most recent follow-up				
<13	34/79 (43.0)	.99	20/79 (25.3)	.25
≥13 and Over	64/149 (43.0)		28/149 (18.8)	
Age at diagnosis				
Under 5	66/151 (43.7)	.76	32/151 (21.2)	.94
Over 5	32/77 (41.6)		16/77 (20.8)	
Time off treatment at most recent follow-up				
<5 Years	14/44 (31.8)	.10	8/44 (18.2)	.65
≥5 Years	83/184 (45.4)		39/184 (21.3)	
Number of clinic visits, mean (SD)	4.4 (1.8)	.07	4.4 (1.7)	.20
Number of late effects experienced, mean (SD)	2.1 (1.5)	.16	2.3 (1.5)	.19
Survivors 13 years and over, n	62		28	
Drinking to intoxication, n (%)	16/31 (51.6)	.26	5/31 (16.1)	.11
Smoker/past smoker, n (%)	3/5 (60.0)	.22	2/5 (20.0)	.28
Using street drugs, n (%)	8/12 (66.7)	.11	3/12 (25.0)	.69

Note: n1: fear of cancer recurrence ever reported; n2: persistent fear of cancer recurrence reported; n: total number of survivors in that category; SD: standard deviation.

[a]Survivors 13 years and over.

follow-up appointment. Fifty-five percent of lymphoma survivors reported FCR at least once and 35% of these survivors reported FCR among multiple clinic visits.

Persistent FCR, operationalized as survivors reporting FCR at 50% or more of their clinic visits, was reported by 21% of survivors (n = 48/228) (for those with two or more clinic visits) (see Table).

TABLE 3 Variables associated with fear of cancer recurrence

	OR	95% CI	*P* value
Demographic factors			
Sex			
Male	1.00		
Female	1.07	0.48-2.37	.87
Age at diagnosis	1.10	0.78-1.55	.59
Age at follow-up	0.82	0.58-1.15	.25
Household income			
<40 000	1.00		
40 000-79 999	0.74	0.27-2.01	.55
> = 80 000	1.45	0.41-5.17	.57
Clinical factors			
Diagnosis			
Leukemia	1.00		
Solid Tumor	2.23	0.69-7.25	.18
Lymphoma	**6.48**	**1.28-32.70**	**.02**
CNS	3.44	0.28-42.45	.34
Relapse			
No	1.00		
Yes	0.11	0.01-1.23	.07
Chemotherapy			
No	1.00		
Yes	1.45	0.15-14.08	.75
Surgery			
No	1.00		
Yes	0.72	0.25-2.08	.55
Radiation			
No	1.00		
Yes	0.88	0.34-2.27	.79
Time off treatment at follow-up	1.00	0.72-1.40	1.00
Physical factors			
Experiencing 2 or more late effects			
No	1.00		
Yes	2.30	0.84-6.32	.11
Experiencing late effects grade 1 or 2			
No	1.00		
Yes	1.80	0.53-6.13	.35
Experiencing late effects Grade 3 or higher			
No	1.00		
Yes	1.50	0.57-3.90	.41
Number of current health problems	1.16	0.90-1.48	.25
Frequent headaches			
No	1.00		
Yes	0.61	0.24-1.52	.29
Chronic pain			
No	1.00		
Yes	0.63	0.19-2.10	.45

(Continues)

TABLE 3 (Continued)

	OR	95% CI	*P* value
Frequently tired			
No	1.00		
Yes	2.06	0.82-5.16	.13
Disturbed sleep			
No	1.00		
Yes	0.56	0.20-1.53	.26
Changes in appetite and weight			
No	1.00		
Yes	0.80	0.27-2.37	.69
Psychosocial factors			
Number of depressive symptoms	**1.66**	**1.04-2.65**	**.03**
Feelings of sadness, hopelessness, despair			
No	1.00		
Yes	0.65	0.16-2.69	.55
Crying easily for no reason			
No	1.00		
Yes	0.40	0.12-1.34	.14

Table presents multivariable analyses where the contribution of each variable to FCR was examined after adjusting for other variables (all of them were entered into the model at the same time) including: sex; age at diagnosis; age at follow-up; household income; diagnosis; relapse; chemotherapy; surgery; radiation; time off treatment at follow-up; experiencing 2 or more late effects; experiencing late effects grade 1 or 2; experiencing late effects grade 3 or higher; number of current health problems; frequent headaches; chronic pain; frequently tired; disturbed sleep; changes in appetite and weight; number of depressive symptoms; feelings of sadness, hopelessness, despair; and crying easily for no reason.

When compared with leukemia survivors, survivors of lymphoma were more likely to experience FCR (OR = 6.48, *P* = .02). In addition, survivors with a higher number of depressive symptoms were more likely to report FCR (OR = 1.66, *P* = .03). No other significant associations between FCR and demographic, clinical factors, nor health concerns were present.

4 | DISCUSSION

This study aimed to describe the prevalence and persistence of FCR and the factors related to FCR among survivors of childhood cancer. We found that 43% of survivors of childhood cancer reported experiencing FCR at least once over a 5-year period in response to a single-item question about FCR. These prevalence rates are within the range recently identified by a systematic review examining FCR among AYA survivors of cancer. In addition, 21% of survivors reported FCR at least 50% of their clinic visits. These findings suggest that FCR is, indeed, prevalent among survivors of childhood cancer and for a subset, a persistent concern.

Prevalence rates were lower, however, when compared to the existing literature on adult survivors of cancer, where an average of 73% of adult survivors report experiencing some degree of FCR. Thus, it is possible that FCR may not be as prevalent a concern among survivors of childhood cancer. However, this cannot be concluded from this study alone, as further research exploring prevalence rates using a more comprehensive and validated measure of FCR is needed. Some of the younger children in our sample may not have had the cognitive capacity to understand the risks of their cancer diagnosis and the potential for their cancer to recur, despite the fact that age at diagnosis was not a significant predictor of FCR. Another reason the prevalence of FCR found could differ from that reported in the adult literature is because of the single-item forced choice question used in this study. This could mean that only individuals with intense fear are selecting “yes” whereas those with lower levels of fear would endorse some FCR on a likert scale. A study with adult cancer survivors that used a forced choice “yes/no” measure to identify FCR found that 46% of survivors reported FCR.

Parents completed the questionnaire as a proxy responder for younger survivors in the sample. Literature on parent-proxy reports suggests parents' own distress influences the perspectives of their children, particularly in the case of psychosocial outcomes (eg, QoL). How parent distress may influence proxy-reports of FCR requires further elucidation. Furthermore, there is currently no literature which explores FCR among parents of survivors of childhood cancer. There is consistent evidence from the adult literature that demonstrates that caregivers do experience FCR as well. The relationships between

survivor self-reported FCR and parent-reported FCR should be another avenue for future research.

In multivariate analyses, when diagnosis was explored as a potential predictor of FCR, lymphoma survivors were found to report FCR significantly more frequently than survivors of leukemia. FCR among survivors of lymphoma has been cited in the adult literature and adult survivors of childhood lymphoma were previously found to report higher FCR compared to leukemia survivors. The reasons for this finding are unknown. There is research to suggest that survivors of lymphoma experience greater pain than survivors of leukemia. Theoretical models of FCR suggest that this fear may emerge as a result of pain signals, and research has found that adult survivors reporting more pain also report more FCR. Interestingly, pain was not a significant risk of FCR in our sample, but given the demonstrated association among adult survivors, this association warrants further investigation.

Our hypothesis that FCR would be related to psychological distress was supported by the association between FCR and depressive symptoms. This finding is critical as it lends support to the notion that FCR in our population may be maladaptive. Although the direction of the relationship between depressive symptoms and FCR cannot be inferred, the current data demonstrate that there is clearly an association between FCR and psychological distress among survivors of childhood cancer.

5 | CONCLUSIONS

This study is one of the first studies to investigate FCR among childhood survivors of childhood cancer from a large, diverse, and representative sample. This study suggests that FCR is a prevalent concern among survivors of childhood cancer and is persistent for a substantial minority of survivors. In our sample, FCR was significantly related to both diagnosis and symptoms of depression. Future research should work to include comprehensive, standardized outcome measures. In addition, development of a more comprehensive measurement tool of FCR appropriate for pediatric settings is needed. Such a tool would allow us to better characterize the experience of FCR among survivors of childhood cancer, and help to elucidate the development of FCR and associated adverse outcomes.

5.1 | Study limitations

This work addresses the greatly overlooked issue of FCR among survivors of childhood cancer and is the first to do so using a large and diverse sample. One of the limitations of this study, however, was the fact that the Long-Term Survivor Questionnaire is not standardized or validated. Moreover, many questions are dichotomous in nature (ie, “yes” or “no” answer choices), which does not allow for a more comprehensive examination of the degree of the spectrum of survivors' concerns. It should be noted that while this format is not ideal to capture the FCR construct, no such tool currently exists to comprehensively evaluate FCR in children. We were also unable to verify whether questionnaires were completed as self- or proxy-report. Recommendations from the clinic were that questionnaires for survivors <13 years of age be completed by parent-proxy whereas questionnaires for survivors ≥13 years of age be self-report due to the nature of some of the health questions designed for this age range (eg, sexual health). Certainly, whether questionnaires were completed by the survivor themselves or their caregiver may impact our findings. However, we feel confident that if survivors did not complete their questionnaires independently, that it was a collaborative process between them and their parents so that the responses reflect the beliefs and attitudes of the survivors. Another limitation of this study lies in the timing of the completion of the questionnaires by survivors. Survivors complete the questionnaire just prior to an annual or bi-annual appointment designed to monitor their late effects and screen for signs of recurrence. Therefore, the prevalence of FCR observed may be elevated due to the increased awareness of the risk of recurrence that survivors experience at this time. Examining levels of FCR throughout the year when survivors are not being reminded of the risk of recurrence may provide insight into how this concern permeates the day-to-day life of survivors.

5.2 | Clinical implications

Results of this study suggest that survivors of childhood cancer should be routinely questioned on their FCR at follow-up appointments. Although a pediatric measure of FCR does not currently exist, future work should aim to develop such a measure that would allow for assessment of FCR in a healthcare setting. In the meantime, survivors could be asked whether they experience FCR. In addition to exploring current feelings of FCR, survivors should be questioned on the persistence of these feelings and whether FCR interferes with daily functioning. Consideration should also be given to comorbidities associated with FCR, specifically depressive symptomatology.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

DATA ACCESSIBILITY

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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