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Attitudes and Perceptions of Parenthood Among Young Adult Survivors of Childhood Cancer

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Purpose: Increasing numbers of childhood cancer survivors enter adulthood and encounter decisions surrounding parenthood. However, limited research has systematically examined how childhood cancer may influence parenthood attitudes among survivors.

Methods: Adult survivors of childhood cancer, who had or wanted to have children ($N=77$; $M_{\text{age}}=30.2$ years, range: 22–43; 91% White), rated their perceived impact of cancer at enrollment and parenthood attitudes using the “Attitudes to Parenthood After Cancer Scale” 2 years later. First, internal consistencies for the parenthood measure were examined, and modified subscales were proposed. Second, hierarchical stepwise regressions analyzed the contribution of background factors and cancer’s impact on parenthood attitudes.

Results: Reevaluation of parenthood items yielded four subscales with improved internal consistency (α ’s $> .78$): improved parenting due to cancer, no children due to cancer, concerns about a (potential) child’s health, and parenthood desire irrespective of own health concerns. Already having children ($n=38$) was related to more favorable ratings on most subscales. Older age was associated with perceiving improved parenting due to cancer ($r=.24$) and shorter time since diagnosis was related to considering having no children due to cancer ($r=-.23$). Hierarchical stepwise regressions reconfirmed parenthood status as related to more favorable parenting attitudes. Cancer preoccupation and perceiving cancer as a most difficult life experience predicted more concerns toward parenthood ($R^2=.044-.216$).

Conclusions: Parenthood attitudes were more favorable among survivors with children, who were older, and/or further into survivorship. Survivors burdened by their cancer experience reported more concerns about parenthood. Childhood cancer may shape parenthood perceptions positively and negatively, warranting further research to inform interventions.

Keywords: cancer preoccupation, childhood cancer, late effects, parenthood attitudes, survivorship

Background

PARENTHOOD IS AN important developmental goal for many individuals in young adulthood.^{1–3} While most adults who want to have children eventually become parents, survivors of childhood cancer face an increased risk for infertility that limits their childbearing potential.^{4,5} Fertility problems and unsuccessful attempts to conceive can cause distress and relationship difficulties among infertile but otherwise healthy adults,^{6–10} consequences that may be even more pronounced among cancer survivors.^{4,11–13} Besides

potential fertility problems, young adult survivors may also weigh emotional and developmental factors unique to their cancer experience when considering having a child. However, limited work has investigated the direct impact of childhood cancer on parenthood attitudes among adult survivor of childhood cancer.

Given that survival rates for childhood cancer now exceed 80%,^{13,14} more survivors are entering adulthood and may want to become parents. In fact, research shows nearly half of adolescents with cancer rate having children as a top three life goal,¹⁵ and general estimates indicate most survivors of

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childhood cancer still desire to have children in adulthood.^{16,17} Accordingly, unintended childlessness in cancer survivors has been linked to poor mental health outcomes (e.g., distress, anxiety, poor adjustment) and heightened reproductive concerns.^{18–22} While studies demonstrate a strong desire for parenthood,^{16,17,19,20} some survivors report concerns and hesitations toward becoming a parent.^{24,25} For example, concerns about an offspring's well-being and health risks (e.g., cancer predispositions, birth defects) have been expressed despite mounting evidence contradicting such concerns.^{4,21,23,25,26} In addition, survivors may worry about their own health, strength, ability to carry a pregnancy,²³ or the demands of caring for a child.^{24,26} Potential relapse or early death are additional worries and possible reasons survivors may refrain from having children.^{23,24,26}

Although such qualitative studies provide anecdotal evidence that parenthood is important, yet, potentially hampered by a pediatric cancer diagnosis, systematic research is needed. Schover et al.²⁷ were the first to systematically examine perceptions of parenthood after cancer while also acknowledging the potential benefits of the cancer experience on parenthood. They developed and administered the “Attitudes to Parenthood After Cancer Scale” (APACS) among young adult males with cancer.²⁷ Most men reported that cancer made them a better parent and heightened the value of family. Yet, 70% also worried about not living long enough to see their child grow up, and 84% felt anxious about their (potential) child's health. Clinically valuable information was gathered, but psychometric testing indicated a suboptimal factor structure.²⁷ Thus, Schover et al. recommended reexamining the questionnaire among other cancer survivors.

In sum, most childhood cancer survivors want to become parents, but family building and perceptions of raising a child can be intertwined with the perceived impact of cancer. Systematic research is needed to understand survivors' attitudes toward cancer and parenthood. This study aims to (1) examine the original and propose a modified APACS suitable for male and female young adult survivors of childhood cancer and (2) test the influence of various background factors and survivors' perceived impact of cancer on attitudes toward parenthood. We expected that survivors who were without children and who perceived a more negative impact from their cancer experience would report greater concerns about parenthood.

Methods

Procedures and participants

Data are from a larger study on psychosexual development among childhood cancer survivors.^{28,29} At enrollment in 2013–2015, eligible survivors were 20–40 years old, diagnosed with a malignancy between ages 5–18, and ≥ 5 years postdiagnosis. Survivors were recruited from a large academic pediatric hospital in the United States. A total of 149 survivors participated and were invited for a follow-up assessment in 2016. At enrollment, survivors reported on the impact of cancer, and medical information was abstracted from medical charts. At follow-up, survivors provided sociodemographic information and completed the APACS. Both parts were completed online with written informed consent completed before starting the survey. Our Institutional Review Board (IRB16-00426) approved all proce-

dures. Of the 149 survivors contacted for follow-up, 2 died, and 28 had outdated contact information. Thus, 119 survivors received the invitation letter and 92 participated online. Twelve survivors (13%) indicated that they were without and did not want to have children and were therefore not presented with parenthood questions. Three survivors reported incomplete data, resulting in a sample of 77 survivors.

Measures

Sociodemographic information. Survivors reported their sex, age, relationship status (partnered vs. single), level of education, and parenthood status (had children vs. not).

Medical factors. Diagnosis (i.e., leukemia, lymphoma, other solid tumor, brain tumor), age at diagnosis (categorized as childhood vs. adolescence), and years since diagnosis were abstracted from medical charts. Survivors were also categorized as having had neurotoxic treatment if they received central nervous system-directed radiation, intrathecal chemotherapy, and/or chemotherapy agents that cross the blood–brain barrier (i.e., methotrexate and/or cytarabine) versus not having received neurotoxic treatment.^{28,30}

Impact of cancer. The 14-item subscale “talking and thinking about cancer” from the “Impact of Cancer Scale” (IOC)³¹ assessed the extent of preoccupation survivors still experienced with their former cancer diagnosis (e.g., worries/concern, rumination). Items were rated on a 5-point scale (not at all–very much). Scores were combined into one mean score with higher scores indicating greater preoccupation ($\alpha = .80$).

If survivors endorsed another IOC item: “Cancer has been the most difficult experience of my life” with a score of 4 or 5 (range: 1–5), they were classified as considering cancer as their most difficult life experience.

Parenthood after cancer. As introduced above, the APACS is a 21-item questionnaire to assess a broad range of thoughts and attitudes toward parenthood among male cancer survivors.²⁷ Items were rephrased to suit male and female survivors and were rated on a 5-point scale (disagree strongly–agree strongly). In line with aim one, we rearranged items into modified subscales and calculated mean scores, with higher scores indicating greater agreement with the respective subscale (see Results section/Table 1).

Statistical analyses

To address aim one, the internal consistency of the original three APACS factors were tested using Cronbach's alpha (α). Guided by these findings, skewness and kurtosis, correlations of all items, and the study team's clinical experience, items were selected and alternative subscales were created. Descriptive statistics and reliability analyses are presented. For aim two, differences and associations between the modified parenthood subscales and various background/medical factors were examined using *t*-tests, one-way analyses of variance, or Pearson's correlations depending on the tested variables: sex, age, relationship status, level of education, parenthood status, diagnosis, age at diagnosis, treatment neurotoxicity, and years since diagnosis. Associations between cancer preoccupation and the modified parenthood

TABLE 1. MODIFIED ATTITUDES TO PARENTHOOD AFTER CANCER SCALE

<i>Subscale</i>	<i>M (SD)</i>	<i>α</i>
Improved parenting due to cancer	3.28 (1.39)	.97
My experience of cancer ...		
... has changed my priorities so that family time is more precious than before.	3.35 (1.45)	
... has made or will make me more appreciative of the joy that children bring.	3.32 (1.55)	
... has increased the value I place on family closeness.	3.32 (1.57)	
... has made or will make me a better parent.	3.22 (1.47)	
... has made or will make me better able to cope with the daily hassles of parenthood.	3.19 (1.35)	
No (biological) children due to cancer	2.33 (1.30)	.87
Being a cancer survivor has limited my ability to take good care of a child financially.	2.66 (1.67)	
Being a cancer survivor has limited my chances of attracting the right kind of mate/partner to help me start a family.	2.61 (1.70)	
Because I fear my own (biological) children would face unusual health risks, I would prefer to adopt a child.	2.09 (1.34)	
Because I fear my own (biological) children would face unusual health risks, I would prefer to have a child by using sperm/eggs from a donor.	1.97 (1.39)	
Concerns about a (potential) child's health	2.67 (1.11)	.86
My experience of cancer has made or will make me more anxious about the health of the children I may have.	3.21 (1.38)	
I think my children would be at higher than normal risk for developing cancer.	2.61 (1.26)	
I think my children would be at special risk for health related problems because of my cancer treatment.	2.48 (1.32)	
I have thought about not having children in the future because I fear they would face unusual health risks related to my history of cancer.	2.36 (1.38)	
Parenthood desire irrespective of own health concerns	3.38 (1.24)	.78
I see myself as healthy enough to be a good parent.	3.52 (1.59)	
I would not want to leave my partner with young children to raise as a single parent if something happened to me.	3.38 (1.46)	
Even if I die young, I would still want to be a parent.	3.25 (1.41)	

The item "If I were infertile because of my cancer treatment, I would consider using donated sperm to have a child" was omitted due to technical errors for not including "sperm and eggs." Nevertheless, the authors would deem this item as unsuitable for inclusion in a subscale due to its ambiguity (i.e., assessment of fertility/infertility beliefs vs. attitudes toward adoption).

SD, standard deviation.

subscales were tested using Pearson's correlations. Independent samples *t*-tests assessed parenthood perceptions between survivors who endorsed cancer as their most difficult life experience versus those who did not. To test the relative contribution of background factors and cancer's impact, hierarchical linear stepwise regression analyses were used. Factors that were significantly associated ($p < .05$) with parenthood perceptions were included in stepwise regression models. Data were analyzed using IBM SPSS Statistics version 25.0.

Results

Sample

Survivors were around 30 years old (range: 22–43 years), predominantly female ($n = 47$; 61%), partnered ($n = 59$; 77%), White ($n = 70$; 91%), and had some college or equivalent education ($n = 54$; 70.2%) (Table 2). Parenthood status was evenly split: 49% had child(ren) and 51% did not but wanted to have children. Survivors were 18 years (range: 7–37 years) from a diagnosis of leukemia ($n = 21$; 27%), lymphoma ($n = 21$; 27%), other solid tumors ($n = 17$; 22%), or brain tumors ($n = 18$; 23%). Most had received neurotoxic treatment ($n = 51$; 66%) and were diagnosed during childhood (i.e., age ≤ 12 ; $n = 42$; 55%).

Parenthood subscales

Internal consistency of the original APACS factors within our sample reconfirmed suboptimal results.²⁷ "Cancer enhancing the value of parenthood" demonstrated an excellent $\alpha = .90$, but alphas were .70 and .40 for the other factors.

Skewness and kurtosis of all items were examined and found within acceptable limits. Further guided by clinical experience and correlations among items, we eliminated four items due to similarity with other items or ambiguous content: "If I were infertile because of my cancer treatment, I would consider adopting a child" assesses not only attitudes toward parenthood but also beliefs about fertility. It is also inappropriate for survivors who know they are (in)fertile and, therefore, not suitable for a broad parenthood measure. "I would not worry today about the risk of cancer for a child of mine, because I believe cancer prevention and treatment will improve so much within the next 10–20 years" and "It is worthwhile to have a child, whether or not the child has an increased lifetime risk of cancer" require various considerations (e.g., worries about child vs. beliefs in medical advancements) and may invoke social desirability. Finally, "I worry about living long enough to see my child(ren) grow up" did not show strong associations with other items, and was similar to the retained item "Even if I die young, I would still want to be a parent." All retained items were grouped

TABLE 2. BACKGROUND FACTORS AND PARENTHOOD OUTCOMES

	N = 77		Improved parenting due to cancer		No (biological) children due to cancer		Concerns about a (potential) child's health		Parenthood desire irrespective of own health concerns	
	M (SD), range	r	M (SD)	d	M (SD)	d	M (SD)	d	M (SD)	d
Age	30.2 (5.0), 22–43	.24								
Years since diagnosis	18.3 (5.5), 7–37	.15								
Sex										
Male	30 (39.0)		3.02 (1.25)	0.30	2.47 (1.24)	0.17	2.53 (1.03)	0.20	3.31 (1.29)	0.10
Female	47 (61.0)		3.44 (1.45)		2.25 (1.34)		2.75 (1.17)		3.43 (1.22)	
Relationship status										
Partnered	59 (76.6)		3.43 (1.44)	0.46	2.32 (1.40)	0.05	2.69 (1.10)	0.11	3.49 (1.28)	0.38
Single	18 (23.4)		2.80 (1.12)		2.38 (0.90)		2.57 (1.18)		3.02 (1.05)	
Parenthood status										
Have child(ren)	38 (49.4)		3.86 (1.32)	0.89	1.93 (1.16)	0.64	2.79 (1.13)	0.27	3.77 (1.27)	0.65
No child(ren)	39 (50.6)		2.72 (1.23)		2.72 (1.32)		2.54 (1.10)		3.00 (1.09)	
Level of completed education										
Elementary/high school	23 (29.9)		2.75 (1.41)	0.06–0.55	2.62 (1.32)	0.03–0.31	2.59 (0.98)	0.00–0.13	3.03 (1.36)	0.03–0.35
Technical or trade school/college	37 (48.1)		3.43 (1.36)		2.23 (1.22)		2.73 (1.16)		3.50 (1.22)	
Graduate/professional degree	17 (22.1)		3.52 (1.36)		2.26 (1.47)		2.58 (1.20)		3.47 (1.13)	
Diagnosis type										
Leukemia	21 (27.3)		3.60 (1.30)	0.11–0.60	1.88 (1.11)	0.08–0.60	2.70 (1.11)	0.10–0.65	3.87 (1.18)	0.08–0.70
Lymphoma	21 (27.3)		3.45 (1.52)		2.67 (1.47)		2.98 (1.11)		3.30 (1.32)	
Other solid tumor	17 (22.1)		2.84 (1.25)		2.54 (1.44)		2.32 (0.84)		3.06 (1.15)	
Brain tumor	18 (23.3)		3.14 (1.45)		2.28 (1.08)		2.58 (1.32)		3.20 (1.22)	
Treatment type										
Neurotoxic	51 (66.2)		3.27 (1.36)	0.03	2.37 (1.21)	0.07	2.72 (1.18)	0.13	3.39 (1.24)	0.02
Nonneurotoxic	26 (33.8)		3.31 (1.47)		2.27 (1.47)		2.57 (0.98)		3.37 (1.25)	
Age at diagnosis										
Childhood (≤12)	42 (54.5)		3.10 (1.39)	0.29	2.19 (1.18)	0.25	2.51 (1.13)	0.32	3.28 (1.24)	0.18
Adolescence (>12)	35 (45.5)		3.50 (1.38)		2.51 (1.43)		2.86 (1.08)		3.50 (1.24)	

Significant differences and associations ($p < .05$) are bolded.

into four subscales demonstrating strong internal consistencies: *improved parenting due to cancer* ($\alpha=.97$), *no (biological) children due to cancer* ($\alpha=.87$), *concerns about a (potential) child's health* ($\alpha=.86$), and *parenthood desire irrespective of own health concerns* ($\alpha=.78$ Table 1).

Parenthood and background factors

Survivors who already had children reported significantly different scores on three of four parenthood subscales relative to survivors who did not have children. Survivors with children scored higher on improved parenting due to cancer [$t(75)=-3.91, p<.001, d=0.89$] and parenthood desire irrespective of own health concerns [$t(75)=-2.86, p=.004, d=0.65$]. They also scored lower on whether cancer limited their perceived abilities to parent a child [i.e., no children due to cancer; $t(75)=2.79, p=.007, d=0.64$] (Table 2). Age at study participation was positively associated with perceptions of improved parenting due to cancer ($r=.24, p=.033$), but survivors who already had children were also older [$t(75)=-5.61, p<.001, d=1.28$]. Increased time since diagnosis was related to lower scores on considering to have no children due to cancer ($r=-.23, p=.040$), yet, survivors who already had children were also further from diagnosis [$t(75)=-3.04, p=.003, d=0.69$]. Parenthood outcomes did not differ by sex, education, relationship status, age at diagnosis, type of diagnosis, or neurotoxic treatment (Table 2).

Preoccupation with cancer was positively correlated with concerns about a child's health ($r=.49, p<.001$), but no other parenthood subscale. Survivors who viewed cancer as their most difficult life experience reported lower scores on considerations of parenthood irrespective of own health concerns compared to survivors who did not express this belief [$t(74)=2.46, p=.016, d=0.58$].

To test the relative contribution of these significant factors to parenthood perceptions, hierarchical stepwise linear regressions were conducted for each subscale. Given the strong effects of parenthood status, regression models examined the contribution of other identified factors first. Age, time since diagnosis, preoccupation with cancer, and cancer as a most difficult life experience were entered in step 1, followed by parenthood status in step 2 (Table 3).

In the first regression, survivor's age was the only significant factor ($\beta=0.250, p=.029$) in step 1 capturing 5% of the total variance in improved parenting due to cancer. When parenthood status was added, it contributed another 10.7% of explained variance ($\beta=0.398, p=.003$), while survivors' age was no longer significant.

In the second regression, time since diagnosis was the only significant predictor of no (biological) children due to cancer ($\beta=-0.238, p=.039$) explaining 4% of the total variance in step 1. Adding parenthood status ($\beta=-0.257, p=.033$) in step 2 significantly improved the model by adding an additional 6% of explained variance and again was the only significant factor.

TABLE 3. HIERARCHICAL STEPWISE LINEAR REGRESSION ANALYSES ON MODIFIED PARENTHOOD SUBSCALES

Variable	B	SE(B)	β	p
Improved parenting due to cancer ^a				
Step 1	$F(1,74)=4.940, p=.029, R^2=.050$			
Age	0.070	0.032	0.250	.029
Step 2	$F(2,73)=7.441, p=.001, R^2=.147$			
Age	0.007	0.037	0.023	.857
Parenthood status	1.105	0.361	0.398	.003
No (biological) children due to cancer ^b				
Step 1	$F(1,74)=4.430, p=.039, R^2=.044$			
Time since diagnosis	-0.058	0.027	-0.238	.039
Step 2	$F(2,73)=4.677, p=.012, R^2=.089$			
Time since diagnosis	-0.034	0.029	-0.142	.235
Parenthood status	-0.668	0.308	-0.257	.033
Concerns about a (potential) child's health ^c				
Step 1	$F(1,74)=22.755, p<.001, R^2=.225$			
Preoccupation	0.804	0.169	0.485	<.001
Step 2	$F(2,73)=11.348, p<.001, R^2=.216$			
Preoccupation	0.795	0.171	0.480	<.001
Parenthood status	0.100	0.229	0.045	.633
Parenthood desire irrespective of own health concerns ^d				
Step 1	$F(1,74)=6.065, p=.016, R^2=.063$			
Most difficult life experience	-0.695	0.282	-0.275	.016
Step 2	$F(2,73)=6.125, p=.003, R^2=.120$			
Most difficult life experience	-0.572	0.278	-0.227	.043
Parenthood status	0.654	0.272	0.265	.019

Factors included in step 1 (age, time since diagnosis, cancer preoccupation, most difficult life experience) were automatically selected based on *F*-probabilities (SPSS: selection method), whereas parenthood status was forced into step 2.

Significant differences and associations ($p<.05$) are bolded.

^a $\Delta R^2=.107, F(1,73)=9.382, p=.003$.

^b $\Delta R^2=.057, F(1,73)=4.702, p=.033$.

^c $\Delta R^2=.002, F(1,73)=0.191, p=.663$.

^d $\Delta R^2=.068, F(1,73)=5.792, p=.019$.

SE, standard error.

For concerns about a child's health, preoccupation with cancer was significant in step 1 ($\beta=0.485$, $p<.001$), explaining nearly 24% of the total variance. Contrary to prior regressions, the addition of parenthood status in step 2 did not improve model fit. Parenthood status was not significant, while cancer preoccupation remained significant ($\beta=0.480$, $p<.001$).

In examining parenthood desire irrespective of own health concerns, perceiving cancer as a most difficult life experience was significant ($\beta=-0.275$, $p=.016$) in step 1 and captured 6% of the total variance. Adding parenthood status in step 2 explained an additional 7% of variance and both factors were significant in the final model (Table 3).

Discussion

Increasing numbers of childhood cancer survivors are entering adulthood where they are engaging in parenthood decisions that may be shaped by the consequences of surviving a life-threatening childhood illness. This can have far-reaching implications for how survivors approach developmental milestones and consider themselves as a potential parent. Through modification of the APACS, we created suitable subscales to assess both positive and negative perceptions of parenthood among male and female adult survivors of childhood cancer.

During its development, the original APACS demonstrated suboptimal measurement properties,²⁷ which were confirmed by poor internal consistency of most of the original factors in this study. Thus, rearrangement and exclusion of several items were necessary to yield more reliable subscales. Moreover, and in further broadening Schover et al.'s work on the APACS, our study highlighted the presence of positive and negative attitudes toward parenthood among both male and female survivors. It also provides systematic support for previous qualitative findings. For example, financial concerns, relationship challenges, or considering alternative parenting options^{20,23,24,26,32} are reflected in increased scores on the items of *not having children due to cancer*. Previous research that identified concerns about a child's health, survivors' own health, and ability to carry a pregnancy^{23,24,26} were captured in heightened item scores of *concerns about a child's health* and hesitations against *parenthood desire irrespective of own health concerns*. Nevertheless, hope and optimism toward achieving parenthood as reported in previous qualitative studies^{20,24} are also reflected in *improved parenting due to cancer*.

Having children was a consistent indicator of more favorable parenthood perceptions. This seems intuitive given that being a parent can directly shape survivors' attitudes and reinforce positive feelings, even if survivors faced difficulties in the process of building a family.^{20,23} It could also be true that survivors with children experienced few limitations in starting a family, thus leading to lower scores on perceived reasons for no children due to cancer. Moreover, scores on concerns about a child's health may also be lower and less relevant if survivors already had a healthy child, or do not anticipate increased cancer risks for their children. Continued exploration of survivors' attitudes and understanding of cancer genetics could be beneficial. Older age and increased time since diagnosis were also related to more favorable parenthood attitudes. This was, however, intertwined with

being more likely to have children, which may rather be the driving force.

Contrary to previous qualitative research, we found no differences between male and female survivors. Previously, females reported more concerns about pregnancies, guilt over possibly not providing a partner with a child, or distress if they remained childless.^{17,21,23} Females also consider timing (i.e., biological clock) an important factor.²⁴ Importantly, the APACS captures broad attitudes toward parenthood, which may explain a lack of sex differences in this study.

In our sample, survivors who were preoccupied or burdened by their former cancer experience also expressed more concerns about parenthood. Interestingly, and despite parenthood status serving as a consistent predictor on most parenthood subscales, preoccupation and cancer as a most difficult life experience captured unique variance in half of the parenthood subscales. For example, survivors preoccupied with their cancer experience expressed more hesitations regarding health risks for a potential child regardless of whether they already had children or not. These findings strengthen the notion that prior stressful life experiences, such as surviving cancer, can play a role in shaping perceptions of future life goals. They also are broadly in line with findings that suggest continued rumination surrounding cancer is associated with increased distress in survivors.^{33,34} Together, these findings underscore the importance of increasing awareness of the multifaceted, long-term effects of childhood cancer, as well as the need for psychoeducation about potential late effects and communicating tailored risk estimates to survivors.

Although this study adds systematic evidence to the literature, certain limitations should be considered. Due to our modest sample size, we were unable to conduct confirmatory factor analyses of the modified APACS subscales, but demonstrated good to excellent internal consistency (α 's $>.78$). In addition, we utilized a stepwise regression approach to avoid overfitting the models and *post hoc* power analyses indicated sufficient power (0.70) to detect medium effects if using five factors per model. Nevertheless, additional psychometric testing and larger samples are needed to substantiate the generalizability of our findings. Second, the IOC-subscale "talking and thinking about cancer" (i.e., preoccupation) was used in its initial version, which was later revised by the original authors.³⁵ We used the original and longer scale for a broader assessment of continued ruminations and worries. Third, our sample lacked racial and ethnic diversity, and factors related to disparities remain to be tested. Fourth, parenthood perceptions were gathered from survivors who had or wanted to have children, to avoid burdening those who did not desire having children ($n=12$, 13%). This implies that we missed surveying those who may be most negatively affected by cancer and therefore already decided to never have children. Reasons for not wanting children remain poorly understood among childhood cancer survivors and voluntary childlessness needs more research attention.³⁶ Fifth, our overall response rate was 52%, which may be regarded as acceptable, although participating in two surveys may have introduced some selection bias. Finally, we were unable to examine gonadotoxicity in relationship to parenthood attitudes. Gonadotoxic treatments have direct effects on survivors' fertility status,¹² but it remains to be

tested whether they also affect parenthood attitudes given that many childhood cancer survivors are unaware of infertility risks and their own gonadal functioning.^{37–39}

Implications

Growing evidence highlights the need for clinicians to support survivors in achieving developmental goals, long-term adjustment, and decision-making across the lifespan. In the context of parenthood, cancer has encouraged some survivors to regard themselves as good (potential) parents. Concurrently, this may be accompanied by a myriad of concerns about their own and an offspring's health. Thus, positive and negative perceptions can coexist and should be considered concomitantly by clinicians. Providers may openly discuss the impact of childhood cancer on parenthood perceptions with survivors and provide information on potential health risks. In addition, conversations about fertility concerns or alternatives to biological parenthood may be beneficial to survivors' family building plans. Future work is needed to better understand parenthood decision-making and how to adequately support survivors through tailored interventions.

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