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Understanding the impact of childhood cancer on survivors' sexuality: sexual dysfunction vs sexual satisfaction

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Abstract

Purpose Psychosexual development disruption and sexual dysfunction are widely recognized as profoundly distressing long-term side effects of childhood cancer. However, the specific sexual challenges faced by young adult childhood cancer survivors (CCS) remain poorly understood. This study used qualitative methods to characterize the impacts of cancer on CCS' sexuality and explore the simultaneous reports of both sexual dysfunctions and overall sexual satisfaction.

Method In-depth, semi-structured interviews were conducted with 41 Spanish childhood cancer survivors with a history of a solid tumour diagnosis (ages 19–28, M = 21.9, SD = 1.79). Reflexive Thematic Analysis identified key themes related to cancer's impact on their sexuality.

Results The interviews revealed three key themes characterizing cancer's impact on CCS' sexuality: negative (physical and psychological), positive (psychological), and no impact. A fourth theme described an apparent inconsistency in participants' testimonies, as they often asserted that cancer had no impact while also acknowledging that it had, in fact, influenced their sexuality.

Conclusion Several interconnected factors likely explained why CCS appeared unaware of cancer's impact on their sexuality. These included the developmental age at the time of diagnosis, a tendency to not relate sexual experiences to their cancer history, a shift in priorities towards survival, a reluctance to explore sexuality due to distressing negative impacts, and a potential need to protect their self-image. Importantly, cancer often positively reshaped their concept of sexuality, emphasizing emotional intimacy and mature relationships. This contributed to high levels of sexual satisfaction that CCS deemed more significant than any negative impact.

Implications for Cancer Survivors Follow-up care should consistently address sexuality, even without patient-reported difficulties, be individualized, multidisciplinary, and encompass both physical and psycho-affective dimensions.

Keywords Childhood cancer survivors · Sexual health · Cancer survivorship care · Psychosexual · Sexual satisfaction

Childhood cancer leaves a lasting impact on the lives of affected children and their families. Over the past few decades, significant advances in medicine have improved five-year survival rates for many types of childhood cancers to more than 80% in high-income countries [1]. These advancements also underscore the increased recognition of the physical, social, psychological, and existential long-term consequences faced by childhood cancer survivors (CCS) [2].

Among these consequences, the psychosocial and physical effects on sexuality are receiving increasing attention in research, after having been long under-studied. Sexuality constitutes a central aspect of health and well-being throughout life, shaped by biological, psychological, and social factors. CCS' sexuality deserves special consideration because

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their cancer experience often occurs before or during adolescence, a critical phase of sexual development in which individuals begin forming their sexual identity [3]. Consequently, their burgeoning sense of self as sexual beings can be significantly impacted, and the physical and psychological effects of cancer and its treatments may raise specific concerns about sexual intimacy [4].

Prior literature indicates that childhood cancer can have a significant impact on survivors' sexuality, which often continues into long-term survivorship [5]. These issues manifest both as physical challenges (e.g., vaginal atrophy, lubrication problems, erectile dysfunction, and reduced sexual desire and arousal [5–7]) and psychosocial difficulties (e.g., reduced sexual attraction, dissatisfaction with sexual life, body image concerns, and struggles to view oneself as sexually attractive) [8–11]. Furthermore, psychosocial experiences associated with cancer, such as isolation, relational difficulties, feelings of alienation from peers, low self-esteem, and poorer mental health, can have enduring effects on their sexual development and relational skills [5, 12, 13]. These challenges often lead to CCS initiating their first romantic relationships later than their peers, having fewer romantic partners, and being less likely to marry [14]. Despite the significance of these issues, clinical research and follow-up care often focus primarily on biomedical facets, neglecting psycho-affective and social dimensions [15].

In contrast to these findings, some research described CCS as having high levels of sexual satisfaction [13, 16, 17] and suggested that childhood cancer does not have a substantial impact on survivors' sexuality. For instance, some authors argued that the impact on CCS' body image was a minor and temporary issue [11], and it was suggested that CCS did not consider that reaching sexual milestones later than their peers was problematic [16].

This apparent disagreement raises several key questions: Are there significant effects of childhood cancer on CCS' sexuality? How can individuals simultaneously report sexual distress and sexual satisfaction? What psychosocial processes underlie this phenomenon? Is sexuality an important subject for CCS? To answer these questions and advance our understanding of this topic, a qualitative approach is essential as it provides in-depth knowledge and enables the development of explanatory theoretical models [18].

This article aims to qualitatively explore the long-term effects of childhood cancer on survivors' sexuality, intimacy, and psychosexual development, to offer insights on how to better support CCS as they navigate the complex transition into adulthood. We use the word "sexuality" to refer to the profound, pervasive, and integral aspect of human identity [19] that encompasses the sexual or sex-related phenomena and modalities of sexual satisfaction observable within biological and psychological realms [20]. We acknowledge that broader interpretations of sexuality are present in the literature, as this is a complex and multifaceted concept that has at times been used to refer to expressions and constructions of sexual feelings, sexual identification, and gender performativity [21].

Methodology

This study used a mixed-methods design, collecting both quantitative and qualitative data. It was conducted in two parts: first a semi-structured interview session, followed by a second session where participants completed quantitative online questionnaires. This manuscript focuses exclusively on the qualitative data from the interviews. Common themes and patterns were identified using Reflexive Thematic Analysis [22], while honouring the individual voices and experiences of the participants.

Recruitment and participants

Young adult CCS were recruited through the database of the paediatric oncology unit of a hospital in southern Spain. The database contained all the individuals diagnosed with solid tumour cancers between 2010 and 2020 who were still alive at the moment of the data collection.

The inclusion criteria for participation were: 1) being between 18 and 29 years old at the time of the interview, 2) having had a cancer diagnosis before the age of 18 and having been in remission for at least 2 years, 3) having adequate cognitive capacity to participate, and 4) being willing to participate and sign the consent form. Participation was voluntary; anonymity in reports was guaranteed at all times, and no compensation was offered. This research was granted ethical approval by the Research Ethics Committee of the Andalusian regional government. The institution's ethical guidelines, as well as the principles outlined in the Helsinki Declaration, were followed throughout all procedures.

Among the 103 potential candidates, 5 individuals were determined to have insufficient cognitive capacity based on their medical records and 6 were experiencing a cancer relapse at the time of the study. The remaining 92 potential candidates were initially contacted via phone to provide a detailed explanation of the study, address potential questions, and schedule a convenient time for interviews with those who agreed to take part. 9 chose not to participate, and in 4 cases, parents declined to provide their children's contact details. 12 had outdated contact details, and 15 could not be reached. Another 11 participants engaged only in the quantitative portion of the study (which is not reported in this manuscript). Eventually, 41 individuals participated in the interviews.

Data collection

The first author conducted the in-depth, semi-structured interviews via videoconference between June and November 2022. The interviews were in Spanish, lasting between 45 and 90 min. Informed consent was obtained verbally before the interviews and again when participants completed the online questionnaires.

The following topics were discussed during the interviews: general socio-demographic information, medical information on the participants' cancer and its long-term effects, such as body scars, body image, mental health and sex-specific worries, sexuality and romantic relationships. Examples of the questions were: Do you currently have any worries related to your cancer experience that upset you? Do you think the cancer has affected your sexuality or your relationships? How would you describe your overall satisfaction with your sexuality? Do you think your sexuality is different than that of your friends who did not have cancer? Standards of follow-up questions were: Could you give me an example? Could you tell me more about this? What sense do you make of this? Participants were candid and willing to share intimate details, even though they were not used to talking openly about their sexuality. Overall, the participants shared having enjoyed the process and felt grateful that their experience was considered important and possibly useful.

Reflexivity statement

To ensure the rigor of this study, the research team engaged in a process of reflexivity. The first-person is used in this section to provide a more evocative account of the first author's background and how it might have influenced the research.

As a female, heterosexual clinical psychologist, I approached this study with a strong interest in the psychosocial impact of childhood cancer. My experience as a therapist, particularly working with patients dealing with trauma and sexual issues, helped me become attuned to issues related to social support and judgement, and to the ways in which the participants' identity formed in relation to and against their peers. While designing this research, it was important to realize any potential pre-judging of the participants' experience of having cancer as inherently negative and consequential for sexuality and, in general, life. While conducting the interviews, my position as a non-Spanish, female researcher likely influenced how participants discussed their sexuality as they felt less intimidated or judged due to perceived cultural distance and the clinical, non-judgmental approach. Conversely, cultural norms around masculinity and vulnerability might have made it difficult for some of the young men to openly discuss sensitive sexual issues with a woman. When perceiving some reticence in the interviews, I reminded participants about confidentiality and safety, inviting them to trust me.

Data analysis

The interviews were, with the participants' consent, audio recorded. The first author transcribed verbatim and anonymized the audio records and field notes. The data was analysed using reflexive thematic analysis, primarily adopting a constructivist-interpretivist epistemological approach [22]. Using the software Taguette 1.4 [23], the first author began the abstraction process by assigning initial codes to emergent phenomena within the dataset. These codes were then grouped into related categories to identify overarching themes, subthemes, and their connections. To ensure rigor, all the authors collaborated in discussions about the subcategories and categories until a consensus was reached, which validated and refined the codebook.

Themes were identified and selected according to their relevance to the phenomenon under study and the research question, rather than frequency, as a theme's importance is not determined by how often it is mentioned [24] and a significant theme can be one participants infrequently mention, remain silent about, or choose not to disclose [25]. However, when all participants discussed a specific theme, this was acknowledged in the text. Inferred themes, instead, were analysed in the manuscript when their omittance or censoring was considered significant [25].

Verbatim quotes were chosen to illustrate specific findings and translated into English by the first author who is fluent in both Spanish and English. Participant identities have been anonymized throughout the manuscript to preserve confidentiality, although their gender was maintained.

Results

Characteristics of the sample

Participants' age ranged between 19 and 28 (M = 21.9; SD = 1.79), age at diagnosis ranged from 3 to 16 (M = 12.27; SD = 2.41), and years since diagnosis ranged from 6 to 18 (M = 9.68; SD = 1.98). They were predominantly Spanish (98%), white (100%), and heterosexual (95%). Of the 41 participants, 26 (63.4%) self-identified as male and 15 (36.6%) as female. Twenty-five (61%) reported being single at the time of the study, 14 (34.1%) were dating uncommittedly, and 2 (4.9%) were in stable relationships. Eight (19.5%) reported never having been in a romantic relationship. Thirty-two (78%) reported having been sexually active during the month prior to the interview, while 7 (17%) said they never had sexual intercourse Table 1.

Table 1 Participant Characteristics

	Number of participants or mean (SD)	Percentage or range
Demographic variables		
Current Age	21,9 (1,79)	19–28
Gender		
Female	15	36,6
Male	26	63,4
Education		
Compulsory Secondary Education	8	19,51
Intermediate Vocational Education and Training	15	36,59
Higher Vocational Education and Training	4	9,76
University	14	34,15
Relationship status		
Single	25	60,98
In an uncommitted relationship	14	34,15
In a stable relationship/married	2	4,88
Sexual debut (intercourse)		
Yes	34	82,93
No	7	17,97
Romantic debut (relationship)		
Yes	33	80,49
No	8	19,51
Cancer-Related variables		
Cancer type		
Lymphomas	11	26,83
CNS tumours	11	26,83
Renal tumours	1	2,4
Malignant Bone Tumours	11	26,83
Soft Tissue and Other Extraosseous Sarcomas	3	7,3
Other Malignant Epithelial Neoplasms and Malignant Melanomas	4	9,8
Age at diagnosis	12,27 (2,41)	3–16
<10 yrs	2	4,88
10–11 yrs	15	36,59
12–13 yrs	12	29,27
14–15 yrs	8	19,51
16 + yrs	4	9,76
Time since diagnosis	9,68 (1,98)	6–18
6–8 yrs	8	19,51
9–10 yrs	24	58,54
11–12 yrs	8	19,51
18 yrs	1	2,44
Time since completion of therapy	6,88 (3,49)	2–17
$\leq$ 5yrs	13	31,71
6-9yrs	19	46,34
$\geq$ 10yrs	9	21,95
Chemotherapy		
Yes	35	85,37
No	6	14,63
Surgery		
Yes	15	36,59
No	26	63,41

Table 1 (continued)

	Number of participants or mean (SD)	Percentage or range
Radiation therapy		
Yes	16	39,02
No	25	60,98
Hormone therapy		
Yes	3	7,32
No	38	92,68

Themes

Four major categories describing the impact of childhood cancer on survivors' sexual life emerged: 1. No impact, 2. Negative impact, 3. Positive impact, 4. Apparent contradictions. Each category is composed of several themes and subthemes, as listed below Fig. 1.

Category 1: No impact

When initially asked about their sexuality, almost all participants indicated that they did not think the cancer experience affected their current sexuality and entirely dismissed the possibility that cancer had an impact on their sexuality. The following themes and subthemes reveal the underlying assumptions or reasons for this initial response:

I don't know

I never thought about it Many participants had never considered the possibility that cancer could have influenced their sexuality and therefore hadn't identified possible impacts. Ana (all names are fictional), for example, replied: "Well, I don't know, I don't know how to answer, to be honest, because I've never thought about it".

It's not a priority Others explained that sexuality wasn't a subject they focused on or that they considered a priority: "I don't know, it's not something I pay much attention to. To be honest, I pay more attention to things like, how is my future going to be? How am I going to walk afterwards? No, that's not something I… I don't know, I don't prioritise it, to be honest" (Daniel). It was even described as a survival mechanism: "I have never really given it [sexuality] importance,

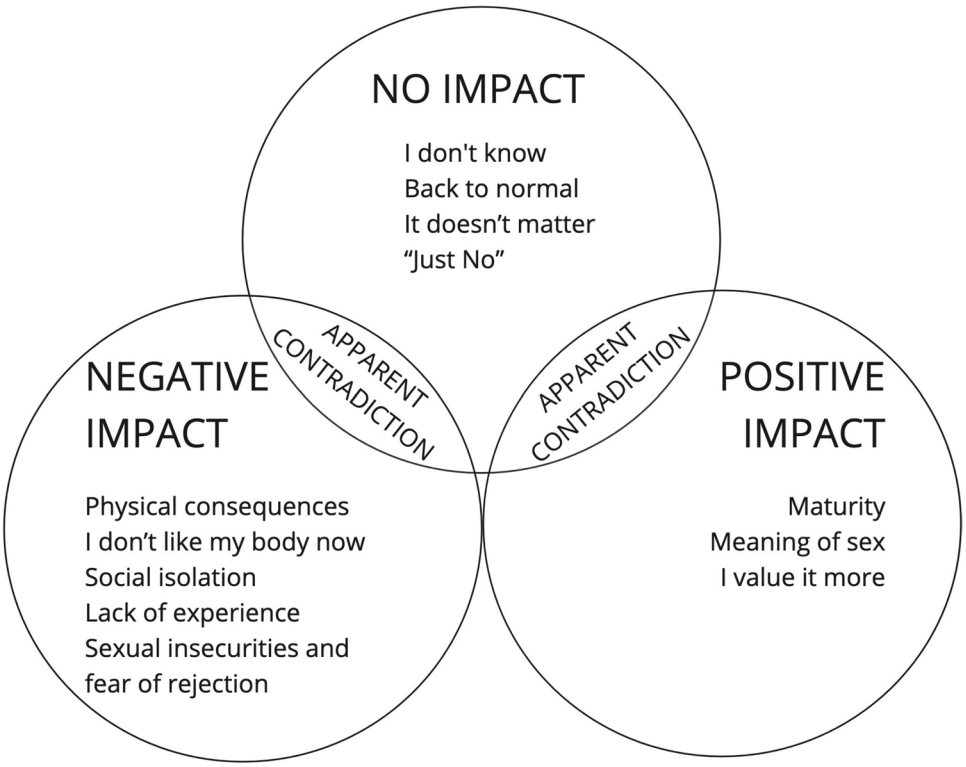

Fig. 1 Concept Map: Impact of childhood cancer on sexuality

and I think that has also been partly in order to survive as I have survived. I have not considered it important, even though I knew it was" (Alberto).

I can't compare When cancer occurred before they became sexually active, participants considered that they couldn't determine if there had been an impact since they did not have a pre-existing sexual experience to compare against: "My first [sexual] relationship was after the treatments. That's how it was for me, how I got to know it. So, I can't tell you if there are any changes" (Eduardo).

Back to normal

Participants who had experienced clear consequences on their sexuality from cancer but whose symptoms had since resolved concluded that there was no longer an impact. For example, Daniel explained that during treatments "desire goes down but then returns a little bit back to normal".

It doesn't matter

Participants who acknowledged that cancer had affected their sexuality often minimized these effects, considering them so insignificant that they did not classify them as "impact".

I am satisfied Because they were satisfied with their sexuality overall, participants deemed insignificant the impact of cancer on their sexual life. For example, Miguel stated: "I am satisfied [with my sex-life], because I was sure I wouldn't experience *any* sexuality in my life, because I was in a hospital for months. So, I am satisfied, very satisfied [with what I have and can do]."

Accepting or normalizing consequences Participants who had either grown accustomed to living with sexual dysfunction or found effective solutions for it minimized the impact of cancer and concluded that their sexual issues were no longer significant: "Since I do not have hormones and all that, there's a lack of desire and lubrication… it's become so routine that I have almost gotten used to it … and since there are other ways [to lubricate], it's not really something that bothers me" (Emma).

However, for some participants, the normalization or belittling of sexual issues was, in fact, a form of ignoring them: "It would have been good to know, but it's not something I've paid particular attention to, so to speak" (Federico). As a consequence, they not always asked for the help they needed. Fernando, for example, had cancer at 16 and explained: "I had erection problems until three years ago. After my illness, the treatment, it wasn't the same anymore. I went to my doctor, and they put me on male hormones. I took injections for a month and since then everything has been fine." It took him seven years—until he was 23—to even consider mentioning the issue to a medical professional.

Just no

Cancer was also described as not having impacted their sexuality at all: "No, no, no, no, there's nothing that worries me or anything. No! No! I don't know how to explain, I'm not worried about anything and nothing has affected my love life or anything else" (Federico).

Category 2: Negative impact

Physical consequences

Almost all participants recognised several physical complications or late effects of their cancer and treatment that negatively affected their sexuality, either directly or indirectly.

General physical difficulties The most common physical difficulties that complicated the participants' sexual practices were tiredness, lack of energy, and pain. Silvia, for example, stated that, to this day, she does not "have the necessary strength" for sexual intercourse. She mentioned that "when I'm having sexual relations with my partner, he is more active than me, he has to do all the work…" Pain was also mentioned as a limitation: "I can't last very long in the sexual act because suddenly my knee hurts or something else occurs [to my body]" (David). The physical difficulties often restricted the versatility of their sexuality, for example, because of having a limb amputated: "What is more difficult after all, having one less leg, is when practising [sexual] positions. It limits me a lot" (Miguel).

Sexual dysfunction Participants reported various types of sexual dysfunction, such as erectile dysfunction, loss of desire, lubrication, and sexual drive. Male participants mentioned that they suffered erectile dysfunction both during treatments and as a lasting side effect: "I had erection problems until 3 years ago. After the disease, after the treatment, it was no longer the same" (Fernando). Furthermore, their sexual drive was completely shut down during treatments: "It turns you off completely" (Luca) and did not always come back after being in remission: "I don't feel like doing it [having sex] as much as my friends do. In that sense I have changed" (Otto). Conversely, hormonal dysregulations, whether caused by the tumour or the treatments, particularly affected the sexuality of female CCS, significantly impairing their desire and lubrication**:** "I don't have the majority of hormones that everyone else has. That influences the fact that I have almost no desire and no lubrication" (Emma).

Stopped sexual development In some cases, both male and female CCS described a delay in their sexual development, as they felt their sexual features developed later or slower than their peers: "My growth stopped. And all the sexual, that too stopped. That's why I look younger. Physically I am not as old as I should be, by age" (Ana). Mercedes explained that she "developed very late. The treatments stopped my hormones, and then they came all at once, so to speak. I grew my breasts in a week… And of course, that has also made me very self-conscious about my breasts. In fact, I want to have surgery."

I don't like my body now

Changed body All participants said that the cancer and its treatments caused many changes to their body, such as hair loss, weight gain, scars, and amputations. The many scars, even though almost always proudly mentioned as heroic battle marks, also negatively impacted physical self-awareness. In some cases, both male and female CCS stated that the cancer had stopped or slowed their growth: "I am shorter than I would have been without all that: I am 1,61 m; it's quite short for a man" (Santiago). These changes were mentioned as distressing: "Well, they shaved all [of my head] … I had a head that looked like [silence]… it was like they took away a part of my identity" (Camila)**.** Living with an amputated limb especially decreased participants' physical and sexual self-esteem. For example, Felipe explained that he feels it's the main reason girls reject him: "I know why it is, I'm not stupid. Because afterwards, they go with the first guy who comes along. Because he doesn't only have one leg: he is in one piece. And *that* convinces them."

Body image concerns Participants shared that these changes had a big impact on their body image, sharing disliking their body now and blaming the cancer for making their bodies this way: "If I hadn't had that [cancer], maybe I would have had a better body. And I blame it on that. If I hadn't gotten so fat, then maybe today I would have had a great body. I've kind of gotten used to not liking my body" (Anaís). This negatively impacted body image was described as hard to live with: "I want to be physically fit. … Yes, but right now [because I was fat] I have what are known as 'belly flaps.' I have it sagging. And, in all truth, there are times when I feel disgusted" (Miguel).

Social isolation

Isolation and loss of social skills All survivors reported that cancer had made them feel isolated from their friends and peers. They felt they no longer fitted in and were maladapted to age-appropriate social functioning: "It [cancer] feels like a bubble in time. Like you're frozen in there and everyone else keeps going and when you come out you have to adapt as best you can" (German). This loss of social skills directly affected their sexuality: "But when it was all over and I started going out and stuff, I had a lot of insecurities about sexuality. I was scared. Like, I'd never done it before … I wasn't able to, when I talked to someone, or whatever, I couldn't even get the words out. But that goes away little by little over time. It still hasn't completely gone away, but it's much less than before" (Felipe).

Feeling different Feeling different from their peers directly affected their ability to form romantic relationships: "I don't really fit in with people my age. It makes it hard to find a girlfriend because girls my age are still playing silly games" (Luca). Furthermore, it made it hard to maintain relationships:

> "Even though you were like them before you started [with cancer], now … you feel like you were surrounded by very childish people. I think this has a negative influence on my [romantic] relationships, because, for example, with my girlfriend, it often happens that I might say: *I don't know, how can you say that or think that way about certain things?* It's true that I find it hard to accept that other people don't have the same mindset about some things as me. And, in the end, that's why I distanced myself" (Valerio).

Seclusion Participant described having actively isolated themselves from others: "Since the cancer happened, I didn't want anything to do with anyone. Well, I wanted to, but I didn't do anything to get it" (Daniel). Over time, this self-marginalization led them to normalize feeling alone, which in turn prevented them from pursuing romantic relationships: "Well, I've gotten used to being alone and I don't usually look for company from anyone, I don't need anyone" (Alberto).

Lack of experience

Perceived lack of sexual experience CCSs believed that they lacked the 'flirting' skills and sexual experiences they would have normally developed during adolescence. "Without cancer, I would have gone out to more places, earlier, I would have done what kids do nowadays, earlier. I wouldn't have all my insecurities. So, no matter how much you want to avoid it, no matter how much, it eventually affects you" (Felipe). Monica, a 21-year-old woman who had never had sexual intercourse, shared: "The truth is that I feel a bit of social pressure from the people around me. And yes, I would like to have experienced *something*. Because now everything seems more daunting. But it [cancer] has conditioned me a lot, yes. It's just that for me it's not as easy as it is for others."

Comparisons and feeling of inadequacy The ongoing comparisons with their peers and their perceived lack of sexual experience generated a feeling of dissatisfaction with their sexual development. Mercedes felt more inadequate in her sexual life than her peers because having cancer during her adolescence meant she missed the common experience of kissing someone: "I thought that I was going against the tide of society and that I was never going to have a boyfriend and that nobody would love me because of cancer, because of the sequela I have, that I was different from the other girls, I looked down on myself a lot."

Lost time and opportunities Participants described a feeling of lost time, stating that cancer had stolen opportunities away from them, making them feel they had fallen behind their friends: "Cancer has taken away years of my adolescence, that playfulness or that learning-experience, that has been taken away from me […] in terms of love-life, what I have lived. At the end of the day, as my friends have been out more than me, they have lived more and know more [about sex]" (Miguel).

Sexual insecurities and fear of rejection

Sexual insecurities Participants mentioned sexual insecurities, interpreting them as both cause and effect of the above-mentioned lack of experience. Ignacio said he did not have more sexual relations "because of insecurity I think, it's not because I don't really want to, I think it's because of insecurity… I feel that I'm going to be judged or whatever, … that I'm going to be judged as a sexual partner".

Fear of sexual inadequacy Their negative body image encouraged their fear of not being adequate sexual partners: "I felt that I was very afraid of doing it wrong, in terms of sex, I was very afraid; I wouldn't take off some of my clothes…" (Mercedes).

Fear of rejection This fear of being judged as sexual partners and being rejected as potential suitors was very strong. For example, when talking about past sexual relationships, Felipe, who had a leg amputated, shared a story of humiliation that he said "really hurt his self-esteem":

> "The last [relationship] I had, she was practically ashamed to be with me. When we went out for coffee with friends it seemed like she didn't know me. When [asked about it], she answered that she had her dignity to protect. She said '*dignity*'! Why? What's so wrong with being seen with me?"

Category 3: Positive impact

Almost all participants reported that their cancer experience had a positive impact on both their lives and their sexuality.

Maturity

First, they felt they gained maturity, which they recognized positively impacted their sexuality.

Communication Feeling more mature meant being able to engage in deeper conversations with their sexual partners: "Thanks to maturity there is more communication, and my sex life is better" (Valerio).

Choice of partners This maturity also influenced their choice of partners. For instance, Felipe explained that "I can't have one-night stands. I have to know the person, who she is, her way of being and thinking. I like someone who has a minimum of maturity. Otherwise, it doesn't work out". Or, in the words of Ignacio: "I have to develop a deep connection with someone to have sex" and Perico: "[Cancer] has made me realise that I really should have [sexual] relationships with people I love and who love me."

Similarly, Ana explained that she is waiting for the right partner and is not up to having sex with just anyone: "Maturity changed my outlook on life. Other people are in a hurry to experience things. Not me. Having had a second chance, I know that [sex] is something important, that you have to enjoy and not be in a hurry for. Things will happen when they happen."

Meaning of sex

Concept of sexuality The profound impact of cancer on the participants' understanding of sexuality shifted the focus from seeking physical gratification to a deeper appreciation of emotional and relational intimacy. As Anaís stated: "Cancer has made [sexual] relationships more intense, profound, and stable". Participants emphasized that cancer served as a catalyst for re-evaluating priorities, leading to a more meaningful and emotionally rich understanding of sex. For all of them, emotions and mutual connection were central to their sexual experiences. Perico, for example, explained:

> "In terms of [sexual] relationships or sex life, I think there has been a positive influence […]. I see it as something more serious, I don't see it only as something to have a good time, but as something much more sentimental, much more intimate between the couple."

For many, this meant avoiding one-night stands to prioritize, instead, deeper and more meaningful relationships:

> "I don't do it with just anyone or that sort of thing. One of my friends has to hook up with someone every night he goes out. I just don't get it. […] For me it's, I don't know, it's like something more intimate. […] It's more than just physical. I care more about the emotional part, about having a strong bond of trust, than the physical part of pleasure" (Mauricio).

Sexual self-confidence These positive impacts led to sexual self-confidence, with participants believing their cancer experience contributed to a deeper, more valuable, and more significant sexuality than their peers'.

I value it more

Participants considered that going through such a hard experience made them value life more, including their romantic and sexual relationships. Since the cancer, Ana said she saw "everything like a second opportunity, so I enjoy everything more". According to Magdalena, "[The impact has been] rather positive because I value [sex] more. I don't do it superficially, I focus on the relationship, on the other".

Category 4: Apparent contradiction

Almost all the CCS who stated that cancer had no impact on their sexual life still acknowledged physical or psychological consequences. This apparent inconsistency in the interviews was observed for both the positive and negative effects of cancer on sexuality. For example, Federico, who claimed that cancer had had no effect on his love life: "No! No! I don't know how to explain, I'm not worried about anything and nothing has affected my love life or anything else", also explained that: "It is true that chemo made me develop [sexually] later. Because of this delayed sexuality, I had a lot of insecurities". Similarly, Camila declared "cancer hasn't influenced my sexuality at all" but also said "it influenced my self-esteem as a sexual partner a lot. I gained a lot of weight because of the treatments. I used to have great hair and a hot body. Now my self-esteem is down. Table 2"

Discussion

Despite initial impressions, our findings reveal both negative and positive sexual consequences, which affected physical, psychosocial, and emotional dimensions. This confirms that childhood cancer has a complex and multifaceted impact on survivors' sexuality. Notably, our results particularly highlight a consistent inconsistency in participants' testimonies: they often reported cancer having no overall impact on their sexuality while simultaneously acknowledging clear effects. It is reasonable to expect CCS to relate both negative and positive impacts at the same time, depending on their interpretation of their cancer experience and different aspects of their sexuality [17]. However, the fact that survivors claimed cancer had no impact on their sexuality while also acknowledging significant psycho-sexual effects is an apparent inconsistency, which resonates with similar inconsistencies in prior research. While some studies point out that CCS suffer from high levels of sexual distress [10], other studies show that CCS have high levels of sexual satisfaction [16]. To understand these inconsistencies, it is necessary to view sexuality as a multidimensional construct and consider the nuanced interplay of childhood cancer experience, sexual life, and sexual self-perception.

First, our data suggest that while sexuality is an important issue for these young adults, they tend to view it as a separate part of their lives, disconnected from their cancer experience. Participants frequently seemed surprised by our questions, often sharing that they had never considered the impact of cancer on their sexuality. A unique characteristic of childhood cancer experience is its timing, as it coincides with or precedes adolescence, a period of significant physical, social, and emotional development [26]. For most of our participants, their cancer diagnosis occurred before they had any sexual experience and for some even before puberty, leading them to believe that cancer could not have influenced a sexuality they only discovered afterwards. This finding, that participants perceived there could be no connection between their cancer history and their sexuality, supports prior research [27]. This tendency to overlook cancer's influence on their sexuality may have been exacerbated by a shift in priorities. Participants often explained that their life-threatening illness made survival their main priority, causing sexuality to be seen as secondary or unimportant. This deprioritizing of sexuality, exacerbated by the discomfort and taboos already associated with it [26], made it even less likely for CCS to explore this aspect of their identity. This corroborates previous literature that suggests cancer disrupts the natural development of sexual identity [3].

Furthermore, as the interviews progressed from general to more detailed and concrete questions, participants became increasingly comfortable discussing their sexuality and were more likely to acknowledge the long-term impacts of cancer on it. This finding supports previous research, suggesting that the way the topic is approached can significantly influence results. Detailed and specific questions can help CCS recognise sexual issues they had never previously considered [28], which emphasizes the importance of using a nuanced and multidimensional approach to sexuality in research and clinical settings.

Table 2 Resume of categories, themes and sub-themes

	Theme	Sub-Theme	Quote
Category 1: No Impact	1.1 I don't Know	I never thought about it; It's not a priority; I can't compare	"My first [sexual] relationship was after the treatments, that's how it was for me, how I got to know it. So, I can't tell you if there are any changes."
	1.2 Back to Normal	No longer an issue	"Desire goes down but then returns a little bit back to normal."
	1.3 It doesn't matter	I am satisfied; Accepting or normalizing Consequences	"Since I don't have hormones and all that, there's a lack of desire and lubrication… it's become so routine that I've almost gotten used to it … and since there are other ways [for lubrication], it's not really something that bothers me."
	1.4 "Just No"	No issues	"No, no, no, no, there's nothing that worries me or anything. No! No! I don't know how to explain, I'm not worried about anything and nothing has affected my love life or anything else."
Category 2: Negative Impact	2.1 Physical consequences	General physical difficulties; Sexual dysfunction; Stopped sexual development	"I don't have the necessary strength. When I'm having sexual relations with my partner, he is more active than me, he has to do all the work."
	2.2 I don't like my body now	Changed body; Body Image concerns	"If I hadn't had that [cancer], maybe I would have had a better body. And I blame it on that. If I hadn't gotten so fat. … I've kind of gotten used to not liking my body."
	2.3 Social isolation	Isolation and loss of social skills; Feeling different; Seclusion	"Well, I've got used to being alone and I don't usually look for company from anyone, I don't need anyone."
	2.4 Lack of experience	Perceived lack of experience; Comparisons and feeling of inadequacy; Lost time and opportunities	"I thought that I was going against the tide of society and that I was never going to have a boyfriend and that nobody would love me because of cancer, because of the sequela I have, that I was different from the other girls, I looked down on myself a lot."
	2.5 Sexual insecurities and fear of rejection	Sexual insecurities; Fear of sexual inadequacy; Fear of rejection	"I don't have more sex because of insecurity I think, it's not because I don't really want to, it's because of insecurity… I feel that I'm going to be judged or whatever, … that I'm going to be judged as a sexual partner."
Category 3: Positive Impact	3.1 Maturity	Communication; Choice of partners	"thanks to maturity there is more communication, and my sex life is better."
	3.2 Meaning of sex	Concept of sexuality; Sexual self-confidence	"The cancer has made that [sexual] relationships more intense, profound, and stable."
	3.3 I value it more		"[The impact has been] rather positive because I value [sex] more. I don't do it superficially, I focus on the relationship, on the other."
Category 4: Apparent Contradiction			"Cancer hasn't influenced my sexuality at all" vs. "it influenced my self-esteem as a sexual partner a lot. I gained a lot of weight because of the treatments. I used to have great hair and a hot body. Now my self-esteem is down."

While cancer seemed to have had no impact on the sexuality of a few participants, the overall trend of our findings supports prior research that suggests cancer influences the sexual health of CCS on both physical and psychosocial levels [5, 10]. We found that the physical aspects of sexuality were affected primarily negatively, whereas the psychological and emotional facets experienced both positive and negative impacts. Even though psychosocial challenges were often deeply felt, participants seemingly found it easier to recognize the adverse physical impacts on their sexuality and connect them to their cancer experience. Our findings diverge from previous studies that found sexual desire unaffected [29], but align with research identifying common sexual issues among CCS, such as pain, lack of energy, lubrication issues, erectile dysfunction, and absence of desire [8]. Our results also support existing research that suggests cancer has a detrimental effect on body image [10, 11, 17]. Indeed, participants' sexual distress appeared to stem not only from the direct consequences of cancer – e.g. sexual dysfunctions – but also from a pervasive feeling of unfamiliarity or even disgust towards their altered bodies. These body image issues impacted participants' sense of identity, lowered their sexual self-esteem, and increased fears of rejection [30].

The participants felt that cancer and its treatment deprived them of the same sexual explorations and opportunities as their peers during adolescence. This finding supports previous literature indicating that CCS tend to reach sexual milestones later and have fewer sexual and romantic partners [9, 14]. In contrast to prior research that suggested this was not a significant concern for CCS [16], our participants described their lack of sexual experience as emotionally challenging and a source of feelings of inadequacy. Because sexuality is a relational experience [30], social difficulties and actual experiences of rejection were particularly painful for participants, reinforcing their negatively impacted body image and fueling fears of being undesirable partners, leading to sexual insecurity. Arguably, this made sexuality an uncomfortable topic, which stifled both sexual exploration and awareness.

Furthermore, our findings suggest that participants often appeared to downplay the significance of negative sexual consequences. This could be because participants had grown accustomed to these issues or had genuinely considered the impact on their sexual lives as insignificant. However, prior research suggests that CCS might also do this to minimize sexual distress, stating they often interpret and narrate their sexual behaviours in ways that preserve a self-image of being well-adjusted and satisfied [31, 32]. While this approach may help them maintain a narrative of normalcy, our findings show that it can be detrimental as it could hinder their ability to seek necessary treatments. This desire to preserve their self-image could plausibly lead CCS to report satisfaction without fully examining their feelings or experiences, offering another potential explanation for the simultaneous reports of sexual satisfaction and dysfunction.

Our findings highlight the importance of the positive consequences on sexuality, noting they were primarily psychological. Consistent with previous research, participants frequently identified increased maturity as a positive outcome [33], reporting that it led to a deeper and more meaningful approach to sexuality [27]. Participants attributed their evolved understanding of sexuality to their experiences as CCS, which they felt led them to prioritise emotional intimacy, mutual trust, and spiritual connection over physical gratification, and to choose more emotionally mature partners, prioritise strong emotional bonds, and engage in open communication [10]. Furthermore, our results, consistent with prior research, indicate that the psychological factors appear to have a more significant influence on sexual quality of life for CCS than physiological ones [34]. This is supported by studies showing that sexual satisfaction among cancer survivors is not necessarily linked to the severity of physical impairments [35] and that sexual distress in CCS is often attributed to physiological late effects, rather than negative self-perceptions of their sexuality [8]. This distinction helps explain how participants, despite acknowledging physical issues, could simultaneously report sexual satisfaction. It also highlights how the ways in which sexual health is conceptualized and measured can influence the research results. This may explain why research focused on physical aspects of sexuality may report high levels of dysfunction, whereas studies exploring psychological and social dimensions might report minimal or even positive impacts.

Strength and limitations

This study provides a comprehensive perspective on the unique sexual experiences of CCS by examining sexuality as a social, emotional, and psychological construct, rather than just a physiological one. Furthermore, the qualitative design offered a detailed exploration of participants' personal experiences, providing a more nuanced understanding of this complex topic that goes beyond a simple "affected vs. unaffected" dichotomy.

This study has several limitations, including the sample's homogeneity, comprised of primarily Spanish nationals and only survivors of solid tumours, which limits generalizability. Additionally, the voluntary nature of participation raises the possibility of self-selection bias, as participants with higher levels of sexual distress or discomfort with the subject might have opted not to participate, potentially skewing results. Also, consistent with our qualitative design, we did not pre-categorize participants by cancer type, severity, or treatment, which allows for a broader understanding of the intersection of these categories [36]. Finally, it is important to acknowledge that challenges with sexuality and intimacy are a normal part of adolescent and young adult development, which can make it difficult to attribute specific issues to the effects of cancer.

Conclusion

This study reveals that childhood cancer can have both negative and positive impacts on survivors' sexuality, and that CCS are often unable or reluctant to acknowledge these effects. We identified several factors that may explain this disconnect: the timing of the diagnosis, which often preceded sexual identity development and led survivors to perceive no connection between their illness and sexuality; the life-threatening nature of the illness, which prioritized survival over other concerns; and the influence of negative emotions and a need to preserve a positive self-image, which may have led survivors to downplay sexual distress. Importantly, surviving childhood cancer appeared to foster a more mature and meaningful approach to sexuality among CCS, which contributed to a deeper sense of sexual satisfaction that ultimately seemed to outweigh the negative impacts identified in the study.

To advance the field, future research should conceptualize CCS' sexuality as a multidimensional construct, examining physical, emotional, social, and psychological factors. This will help identify the mechanisms through which cancer causes these impacts and, in turn, facilitate the prevention of adverse sexual health outcomes. Additionally, longitudinal studies could offer valuable insights into how these perceptions of sexuality evolve over time and how to adjust survivorship care accordingly.

Our findings underscore that the impact of cancer on CCS' sexuality is a real and complex issue and highlights the need for a proactive, patient-centred, and individualized approach in survivorship care [38] that empowers individuals to openly discuss their sexual health, leading to improved overall well-being.

Implication for psychosocial providers

CCS need specialized support to navigate the physical and psycho-affective aspects of their post-cancer sexuality [7]. Effective interventions should go beyond physical dysfunctions to address psychological and social aspects of their sexuality, such as body image concerns, sexual fears, and insecurities. Providing CCS with strategies to address these issues [10] should include helping them see the positive impacts of their cancer experience, as this has been shown to reduce the impact of adverse effects [37].

This research indicates that because CCS may be unaware or minimize their sexual health challenges, it is essential for healthcare professionals to systematically address the topic during long-term follow-up care, even when patients report no difficulties. Healthcare providers should know that a general message of sexual satisfaction does not necessarily negate the presence of sexual distress or the need for support [38]. It is therefore crucial to build rapport with CCS and ask direct, explicit questions about their sexuality, sexual practices, and sexual life. Survivorship follow-ups should also systematically provide educational and supportive resources that are specifically designed to address not only the physical but also the psychosocial and emotional aspects of post-childhood cancer sexuality [15, 39].

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Data availability The data cannot be made available due to the presence of sensitive and confidential information, including patient information.

Declarations

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