

The impact of cancer on romantic relationships and marriage post-diagnosis among young adult cancer survivors in Japan: A qualitative study

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Marriage, Dating, Romantic relationships, Interview, Qualitative

## **ABSTRACT**

### **Purpose**

This study explored the impact of cancer on romantic relationships and marriage post-diagnosis among adolescents and young adults (AYAs) who had been diagnosed with cancer in Japan.

### **Methods**

Semi-structured interviews were conducted with 24 AYA cancer survivors, regardless of cancer type, who were unmarried and aged 15–39 at the time of cancer diagnosis. For theme and category generation, the authors coded the interview transcripts independently through inductive thematic analysis.

### **Results**

The analysis yielded 11 themes. The most common impact on romantic partnership was “fertility and parenthood concerns” (45.8%), followed by “disclosure of cancer history” (37.5%), and lastly by “recurrence, metastasis, and poor health” (25.0%).

### **Conclusions**

Although the impacts of cancer that were identified in this study were mostly consistent with earlier findings, certain impacts seem to stem from traditional family perceptions in East Asia. Since men are traditionally seen as the family successors, unlike women, they are primarily concerned about fertility and parenthood. This causes a parental influence on romantic and

marital choices. The fact that there exists a parental influence in partner selection from the parents of both men and women, indicates that cultural factors in East Asia/Japan influence romantic and/or marriage post-diagnosis.

## 1. BACKGROUND

Cancer morbidity among adolescents and young adults (AYAs) of 15–39 years of age when diagnosed, comprises only a few percentages of all cancer incidences in Japan.<sup>1,2</sup> Nonetheless, cancer significantly affects their lives since cancer diagnosis and treatment coincide with major life events, such as education, employment, marriage, and parenthood.

Among age-specific psychosocial issues of AYAs, cancer survivors have lower marriage rates than the general population, including their siblings.<sup>3-10</sup> In studies that addressed the impact of cancer on intimate relationships, certain dating barriers were identified. These included a damaged self-esteem due to a compromised body image, the challenges in disclosing cancer history to potential partners, sexual dysfunction, and possible infertility.<sup>11-18</sup>

Of these, compromised fertility has a major impact on life post-diagnosis for AYA cancer survivors.<sup>19</sup> AYAs experience feelings of devastation at possible fertility impairment following a cancer diagnosis and subsequent treatment.<sup>20,21</sup> Most AYA patients do not have prior knowledge regarding the possible impact of cancer on their reproductive health.<sup>20,22</sup> The associations

between treatment-related infertility and patients' mental health and quality of life have been thoroughly studied.<sup>23-28</sup> Fertility concerns include the uncertainty of fertility status<sup>23</sup>, health of the child<sup>23,29</sup>, and impact on future relationships.<sup>24,30</sup> One web-based survey revealed that more infertility concerns were associated with being unmarried.<sup>31</sup> Moreover, women are more likely to feel distressed about fertility impairment than are men.<sup>23,24,28,32</sup> In addition to these concerns, women need time to undergo complex fertility-preservation procedures, resulting in possible treatment delay<sup>33</sup>, limited period of time to have children<sup>34,35</sup>, the impact of pregnancy on disease recurrence and their own health<sup>23,36,37</sup>, and premature menopause due to treatment.<sup>31,38,39</sup> Furthermore, the possibility of impaired fertility is a threat to gender identity among both men and women<sup>24,40</sup>. Fertility preservation not only helps patients maintain the ability to bear children but also reaffirms gender identity, although lack of information on fertility-preservation options prior to initiating cancer treatment is a common fertility-related concerns.<sup>11,22,29,41,42</sup>

Sexuality is sometimes associated with fertility issues and also an important aspect of quality of life for AYA cancer survivors. Sexuality is well described in research in patients with reproductive cancers such as breast, gynecological, and testicular cancer.<sup>11,43-45</sup> Sexual dysfunction due to cancer treatment could affect both physical (eg, decreases in sexual desire and functioning, and thereby infertility) and psychological aspects (eg, view of themselves as sexually undesirable, a fear of possible rejection by their current or future partner). Physical

disfigurement due to cancer treatment also negatively impacts the formation of new relationships. This can be seen in breast cancer survivors who suffered a mastectomy,<sup>14,15</sup> and colon cancer survivors with ostomies.<sup>46</sup> Sexuality in non-reproductive cancers is understudied but regardless of cancer types, it remains an obstacle in the intimate relationships of its survivors.<sup>12,47-49</sup> Sexuality was more likely to be rated as an important part of life in people with non-reproductive cancers than those with reproductive cancers in a sample outside the AYA age range.<sup>39</sup> A study of sexuality that compared reproductive and non-reproductive cancers in an AYA population also showed that there were no differences in sexual supportive care needs and sexual satisfaction across cancer types, although female reproductive cancer patients reported more changes in their sexuality.<sup>50</sup> One possible explanation for this similarity across cancer types is that the psychological impact of cancer treatment is greater than the physical impact.<sup>50,51</sup> In addition, overarching issues other than sexuality and fertility are often discussed between AYA cancer sufferers and may exist throughout the spectrum of cancer types.

Disease severity has a greater impact on these concerns. A qualitative study indicated that young cancer survivors with advanced cancer felt developmentally delayed in the wake of their friends who got married and had children.<sup>52</sup> In contrast, a quantitative research in female cancer survivors with early to metastatic breast cancer found no differences in cancer stage between partnered and un-partnered women.<sup>53</sup>

In a study that focused on romantic relationships post-diagnosis,<sup>15-18</sup> survivors who ended preexisting relationships post-diagnosis as well as those who were unpartnered at diagnosis, were impacted by their concerns of the disclosure of their conditions when they entered new romantic relationships. A study that included both partnered and unpartnered testicular cancer survivors also revealed that unpartnered survivors found it more difficult to disclose their diagnosis to potential partners than survivors who were already partnered.<sup>19</sup>

As childhood cancer patients are generally unpartnered before cancer diagnosis, research on childhood cancer survivors has addressed romantic relationships post-diagnosis.<sup>54,55</sup> However, while childhood cancer survivors form romantic relationships and consider marriage after completing cancer treatment, AYA survivors receive cancer diagnosis and treatment when romantic relationships and marriage are focal. Therefore, AYAs and childhood cancer survivors appear to have different psychosocial issues related to romantic relationships and marriage.

So far, very little attention has been paid to interventions focusing on forming romantic relationships post-diagnosis; however, one intervention that included education and support regarding sexuality, fertility, and romantic relationships improved anxiety regarding sexuality and romantic relationships and decreased psychological distress in AYA cancer survivors.<sup>56</sup>

It is important to note that all such research was conducted in Western countries and that cultural factors may impact survivors' romantic relationships and play a role in determining their

marriage partners. Greater parental influence over mate selection is reported in collectivist cultures, such as Asian societies, where families have a more active role in the romantic relationships and marriages of its members than in Western-individualistic cultures.<sup>57-59</sup> For example, approximately 70% of single Japanese adults live with their parents,<sup>60</sup> and parent-child co-residence is associated with a lower probability of meeting romantic partners.<sup>61</sup> Cancer survivors are likely to live with their parents for longer than their peers,<sup>10,62</sup> thus being subject to greater parental interference in relationships.

Cancer research in Asian populations determined that Korean childhood cancer survivors were concerned about possible rejection by the future partner's parents, due to marriage being a family matter in Korea.<sup>32</sup> In Japan, where similar cultural perspectives to Korea exist, families might be equally influential in partner selection and marriage approval.

An additional cultural factor possibly indirectly influencing fertility-related concerns is that child adoption is uncommon in Japan, while adoption is a widely accepted means of forming a family in many Western societies.<sup>63</sup> Hence, having a biological child is almost the only chance for parenthood in Japan. Adoption outside the bloodline or of children with an unknown background is not traditionally desirable in Japan; thus for the purpose of secrecy, adoptive parents prefer to adopt a child of Japanese origin who looks like them.<sup>64</sup> The child must also be registered in the family registry system, which is fairly open to public scrutiny and may threaten

adoption confidentiality. Unlike Western societies, Japan has a family registry system that originated in East Asia and is currently used only in Japan and Taiwan, where citizens are recorded as a family member of the household when they are born, married, or adopted. In this system, the family consists of married couples and their children, who share the same surname. Thus, marriage is a relationship between households not only between the couple.<sup>65,66</sup>

Despite the importance of romantic relationships and marriage post-diagnosis, this topic is understudied in Asian cultures, including Japanese culture.

Thus, the purpose of this study was to explore the impact of cancer on their romantic relationships and marriages post-diagnosis by focusing on Japanese AYA survivors of all cancer types. In the context of this study, the term “romantic relationships” refer to voluntary interactions that are mutually acknowledged, marked by mutual expressions of affection.<sup>67,68</sup>

## **2. METHODS**

### **2.1 Participants and procedures**

Semi-structured interviews were conducted with 24 AYA cancer survivors who were unmarried and aged 15–39 at the time of diagnosis and 20–45 when interviewed. The types of cancer they were diagnosed with were not taken into account for the interviews. Romantic relationships and marriage post-diagnosis are exploratory research topics in an Asian population; therefore, the



current study did not focus on a specific cancer type but included all types of cancer. After obtaining approval from the University of Tsukuba Ethics Committee (Tokyo 29–1), the research description and request form for cooperation were sent to three advocacy groups and two patient associations to recruit participants. Potential participants were referred to the first author by the advocacy group or contacted the author themselves. The author provided a detailed written explanation of the goals, procedures, and privacy protection of the research to each potential participant. A total of 27 respondents expressed interest in participating in the study. Since the study aimed to specifically examine post-diagnosis relationships, three participants were excluded because they had started relationships with their spouses before being diagnosed and accordingly did not attempt to start a new relationship post-diagnosis. The first author was unacquainted with the participants prior to the interviews. After obtaining written informed consent, the first author conducted face-to-face interviews with all participants, except for two who were interviewed via Skype video call due to them living far away. Participants received an \$18 gift card for participation. The interview questions were determined in reference to previous studies that addressed romantic relationships post cancer diagnosis. The interview began with general questions about sociodemographic characteristics (age, marital status, occupation) and cancer-related information (cancer type, age at diagnosis, treatment received). The questions used in the interviews regarding romantic relationships and marriages are listed in Appendix 1.

## 2.2 Data analysis

All interviews were digitally recorded and transcribed. Inductive thematic analysis was used to identify patterns and themes in the data.<sup>69</sup> Initially, the first author, who was trained in qualitative methodology, and the second author, a university social psychology faculty member, carefully read the interview transcripts and independently extracted all meaning units of cancer impact on romantic relationships and marriage post-diagnosis. Relevant meaning units were grouped by similarities to form higher-order categories, yielding 20 categories, from which related categories were integrated into higher-order themes. Categories not grouped with other categories were created into themes. Accordingly, 11 themes were generated, named, and classified as negative, positive, or no impact. The authors reviewed all categorization processes, checked whether themes and categories appropriately reflected the meanings in the interview data, and generated definitions of each theme and category. Discrepancies and inconsistencies were discussed and resolved by the authors. After 19 participants had been interviewed, no new information was gained from additional interviews, so theoretical saturation was deemed to have been reached.<sup>70-72</sup> This was confirmed by the interviewing of five additional interviewees. Subsequently, a rater trained in qualitative methodology who was not involved in the categorization procedure, carefully categorized meaning units from the transcripts according to

the definitions of themes and categories created by the authors. The concordance rates for each theme identified between the rater and authors were 72.7% for fertility and parenthood concerns, 80.0% for disclosure of cancer history, 71.4% for recurrence, metastasis, and poor health, 100% for changes to physical appearance, negative response from potential partners and partner's parents, and family reluctance, 66.7% for sexual dysfunction, 75.0% for no room for romance, 66.7% for decreased confidence in romantic relationships and marriage due to cancer history, and 100% for positive impact and no impact. The overall Kappa score was 0.79. When the ratings were inconsistent between the rater and authors, the authors discussed and reviewed the themes and categories, refined the definitions, and made the final judgment together after discussion until all inconsistencies were resolved. To ensure the anonymity of participants, personal information was omitted from the text's direct quotes.

### **3. RESULTS**

#### **3.1 Participants**

The participants comprised 8 men (33.3%) and 16 women (66.7%); all were Japanese, heterosexual, 15–38 years at diagnosis, and 24–43 years when interviewed (mean, 27.1 years at diagnosis and 35.5 years when interviewed). By type, the cancers were gynecological (cervical, endometrial, and ovarian) (25.0%), breast (20.8%), testicular and leukemia (12.5% each), gastric,

sarcoma, and colon (8.3% each), and lymphoma (4.2%), covering the common cancer types among AYAs in Japan. Of the 24 participants, 7 were in partnerships when diagnosed but ended the relationships thereafter, while 18 were in partnerships when interviewed. The mean interview length was 81.7 minutes. The term “partner” refers to a spouse, fiancé, or boyfriend/girlfriend.

### **3.2 Cancer impact on romantic relationship and marriage post-diagnosis**

Themes, categories under each theme, exemplar quotes, and the number of participants whose responses reflected each theme are shown in Table 1. Numbers in parentheses after interview quotations indicate sex, cancer type, and age when diagnosed.

#### **3.2.1 Fertility and parenthood concerns**

Fertility and parenthood concerns, reported by 11 participants (five men and six women), were the most common themes.

##### *(Potential) infertility*

Potential infertility due to cancer treatment was the most common category of concern reported by nine participants. Most of them felt distressed about depriving their partner of chance for parenthood or felt that they were undesirable as a partner for not being able to have children.

Two women felt more depressed about their infertility than their cancer diagnosis. One of the female survivors who married the eldest son of a respectable family with a long familial history felt sorry for not being able to provide an heir to her partner's family:

*“When I saw an array of graves of my partner's ancestors dating back to around 1830, I felt really sorry for the family because I could not produce an heir for them.” (Female, 22; Acute myeloid leukemia)*

She was distraught when her father-in-law accidentally thanked another of his daughter-in-law in her presence for giving birth to his grandchild.

#### *Hesitant to have children due to cancer susceptibility gene mutations*

Dating and marriage were more challenging for two participants who tested positive for cancer-related gene mutations, which severely affected their life plans after cancer. One participant said:

*“Since I thought that I should not have children after the mutation was identified, I did not try to find a girlfriend.” (Male, 27; Colon cancer).*

He continued, *“I feel sorry as the eldest son of our family that I will not transmit my family name.*

*I wonder if my decision is correct. My family line might die out.”*

### **3.2.2 Disclosure of cancer history**

Disclosure of cancer history, the second most common cancer related concern that has an impact on romantic relationships and marriage, deterred the cancer survivors from having close relationships, as they feared disclosing their cancer history to potential partners. Nine participants (three men and six women) feared disclosing their cancer history to potential partners and/or partners' parents. Almost all participants who described self-disclosure concerns also had fertility problems.

#### *Disclosure to potential partners*

Five participants struggled with when, how, and to what extent to disclose their cancer history. While they would like to start a new romantic relationship, they feared the anticipated rejection of them due to their cancer history. The effects of the cancer history that they felt they needed to disclose to future partners included physical conditions, sexual dysfunction, fertility issues, and surgical scars.

#### *Disclosure to partners' parents*

Five participants expressed concerns about cancer-related self-disclosure to their partner's parents. Despite their partner's acceptance, cancer survivors were afraid that their partners'

parents would have bad impressions of them because of their cancer history and, therefore, oppose their relationship and the prospect of marriage. The participants also felt responsible for not being able to produce heirs due to their infertility. A man who had been rejected by his girlfriend at the time of diagnosis feared rejection from his new partner's parents when the time came to he asked them for her hand in marriage:

*“I was very afraid of how her parents would respond when I told them that they might not see grandchildren. I worried about being deemed ‘damaged goods’ by them, but in the end I was relieved that they permitted the marriage, saying, ‘Our daughter chose you as her partner. (Male, 20; Testicular cancer)”*

### **3.2.3 Recurrence, metastasis, and poor health**

Six participants (three men and three women) reported the possibility of cancer recurrence, metastasis, and poor health to be challenges in pursuing a romantic partner.

#### *Recurrence*

Possible cancer recurrence made them hesitant to seek a romantic partner. Participants often compared themselves with their healthy peers. A woman whose cancer recurred after she started dating her current partner said:

*“When I consider dating someone I always think that he must prefer a healthy partner to someone with a risk of cancer recurrence, like me. I, therefore, ask if he was really ok with me having such a risk.” (Female, 19; Sarcoma)*

### **Metastasis**

Forming new romantic relationships and marriages post-diagnosis is tougher for those whose cancer metastasizes. They made hesitant remarks about finding a partner by imagining their situation from the partner’s potential perspective. A woman who had stopped seeking a partner after metastasis said:

*“Viewed the other way, I would not know how to respond if a guy who was unlikely to live long asked me for a close relationship.” (Female, 31; Breast cancer)*

### **Poor health**

Poor health due to cancer treatment has also hindered their romantic lives. Some survivors had been suffering from persistent poor health following cancer treatment, which made them reluctant to seek romantic partnerships. They compared themselves with healthy people, like the aforementioned participants with cancer recurrence did.



### **3.2.4 Changes to physical appearance**

Changes in physical appearance, such as alopecia, scars, and stoma, were reported by five participants as a barrier to romantic relationships. Interestingly, only one woman reported distress related to physical changes resulting from cancer treatment as a hurdle, even though most female survivors experienced it. The woman said:

*“I have a surgical cavity from breast-conserving surgery. I wonder when I will allow myself to reveal my scar to a future partner.” (Female, 34, Breast cancer)*

### **3.2.5 Negative responses from potential partners and partner’s parents**

Cancer survivors experience direct and indirect negative responses from potential partners or their partners’ parents. Direct responses are those that cancer survivors received directly from others regarding romantic relationships or marriage, while indirect responses are those in which cancer survivors heard about negative responses through secondary channels, such as comments that other cancer survivors received from people.

#### *Direct response*

Three participants (one man and two women) experienced dissolution or withdrawal by partners immediately after cancer disclosure.

*“I was rejected twice by girlfriends because of cancer. The first was on the day I was diagnosed with cancer. I realized that cancer history hindered partner seeking.”*

*(Male, 29; Gastric cancer)*

### **Indirect response**

Two women experienced indirect negative responses from others regarding marriage. They heard of or saw young cancer survivors rejected by a partner or partner’s parent. A woman who experienced an indirect negative response during cancer treatment said the following:

*“I was watching an Asian TV drama in which a survivor of the same cancer as mine appeared. She wanted to marry her partner, but was rejected by the partner’s mother, who told her, ‘I do not want to have a daughter-in-law with cancer!’ I was shocked to hear this. I feared I would be told the same thing in the future.”* (Female, 23; Gastric cancer)

### **3.2.6 Family reluctance**

Four participants (two men and two women) reported that family members developed an unfavorable attitude toward romantic relationships and marriage post-diagnosis.

### *Cancer survivor's family*

One survivor was met with objections from her family, who had lost a loved one through cancer before. Her mother and sister supported her seeking a dating partner but not a marriage partner because she knew how hard it was to care for a family member with cancer.

### *Partner's family*

In one case, a family member of a partner expressed concerns about her daughter's potential hardship in life while being with a cancer survivor:

*“My mother-in-law perceived me unfavorably because of my cancer when we married. I learned that from my partner.” (Male, 29; Gastric cancer)*

### **3.2.7 Sexual dysfunctions**

Three participants (one man and two women) expressed that deteriorated sexual functioning was an obstacle in establishing new intimate relationships. Their remarks suggest that unmarried survivors find it uncomfortable to raise this sensitive subject with medical professionals. Accordingly, they receive inadequate information on post-treatment sexual functions. A woman who managed to bring herself to ask her male physician about her post-surgery sexuality said:

*“I was worried whether I could have sexual intercourse after surgery. I might be*

*told that it was not appropriate to discuss such issues in the face of life-threatening disease, but I dared to do so because it was important to me.” (Female, 38; Cervical cancer)*

She continued, *“It was a hard question to ask, even for an out-front person like me. I think people cannot usually ask medical professionals about their sexuality.”*

### **3.2.8 No room for romance**

Three participants (two men and one woman) mentioned that cancer treatment did not allow them much room for romantic opportunities. Cancer survivors had difficulties with school or work and stayed away from their friends, resulting in few opportunities to find romantic partners. A male survivor reported that his long-term treatment led to fewer social interactions and thereby fewer opportunities to meet a partner.

*“I had completely lost social involvement during long-term hospitalization. After I returned to university, I had enough difficulties in studying to graduate, which reduced my opportunities to find a girlfriend.” (Male, 21; Sarcoma)*

### **3.2.9 Decreased confidence in romantic relationships and marriage due to cancer**

## history

Two participants (one man and one woman) reported their cancer histories impacting their post-treatment romantic encounters. They went through break-ups with partners who were already committed to them at the time of diagnosis or received fewer dating requests from matchmaking services because of their cancer history. A man who felt miserable after processing the loss of a partner said:

*“I was losing confidence that I would be able to marry after my cancer diagnosis. Before the diagnosis, I had a vague picture of my future in which I would marry and raise a family, but after the diagnosis it seemed difficult for me to find an accepting partner.” (Male, 20; Testicular cancer)*

### 3.2.10 Positive impact and no impact

One man reported a positive impact after being diagnosed, and two women reported no impact on romantic relationships. All of them succeeded in forming a new romantic relationship after diagnosis. The man who reported a positive impact felt desperately alone and attempted suicide after cancer recurrence, but after joining a peer support group for AYAs, gained the chance to express his concerns, and met his current partner there. Two female survivors reported no negative experiences after cancer diagnosis with regard to romantic relationships. One of them

said:

*“I talked about my cancer history before starting a relationship and entered a committed relationship only with a man who accepted it, so my cancer history has not influenced my romantic relationships.” (Female, 15; Acute myeloid leukemia)*

#### **4. DISCUSSION**

The common cancer impacts on romantic relationships and marriage, post-diagnosis, identified in this study were fertility and parenthood concerns, disclosure of cancer history, recurrence, metastasis, and poor health.

As shown in the literature,<sup>16,19-21,23-39,73</sup> cancer survivors are anxious about the impact of treatment on their reproductive potential and/or hereditary risk in their offspring. As found in previous studies<sup>14,17,19</sup>, survivors with “fertility and parenthood concerns” described their fear of disclosing their cancer history, including reproductive problems, to potential partners. “Recurrence, metastasis, and poor health” also corroborates earlier findings.<sup>29,74</sup> Possible or actual cancer recurrence and metastasis, in addition to poor health due to cancer treatment, cast a negative shadow on seeking a romantic partner.

Although most of the cancer impacts observed in the present study corroborate those identified in earlier studies, factors behind some of the impacts were first identified in this study

and may be considered attributable to East Asian and Japanese cultural values and customs.

First, fertility and parenthood concerns, the most common cancer impact, are as salient for male as for female survivors and revealed different factors from past studies that found female cancer survivors to be more concerned about disturbed fertility than males.<sup>23,24,28,32</sup> Male survivors accounted for about half of those who reported fertility and parenthood concerns in this study. A possible factor affecting fertility and parenthood-related perceptions among men is the importance of family lineage and filial piety (respect for parents and ancestors) in East Asia.<sup>75,76</sup> The Japanese Civil Code (1898–1912) stipulated that the eldest son inherited the household headship according to patrilineal principles.<sup>77</sup> Even at present, nearly 40% of Japanese, particularly men, believe that they should have at least one male child for the family lineage.<sup>78</sup> Thus, men are likely to associate fertility and parenthood concerns with familial succession. Although few men in the study expressed a desire for fatherhood, they felt guilty for their failure in having children to pass down their family name. The present findings indicate that AYA cancer survivors in Japan are still affected by traditional family thinking and experience culturally unique fertility and parenthood-related perceptions.

Second, parental influence was a recurrent theme throughout the interviews. In addition to “fertility and parenthood concerns,” whose influence was most notable, the present study generated the theme of “family reluctance,” defined as family objections to romantic

relationships or marriages post-diagnosis. Families in this research characteristically included families-in-law. Furthermore, concerns about cancer-related self-disclosure to their partner's parents have been reported under the theme of disclosure of cancer history. Among similar studies, only a Korean study mentioned family involvement in seeking romantic partners.<sup>32</sup> In Japan, "letting parents hold their grandchildren in their arms" is a fixed phrase for the greatest filial piety and is associated with "fertility and parenthood concerns" discussed above. Regardless of the desire for children, those without children feel guilty for not being filial toward their parents.<sup>79</sup> Cancer survivors reported a variety of distresses, such as the possible failure to give their partner a chance to experience parenthood and denying grandparenthood to parents and parents-in-law, the discontinuation of the family lineage, and/or mixed feelings toward a sister-in-law who produced an heir to the family. Moreover, with regard to "disclosure of cancer history," half of the survivors who described a fear of responses from their partners reported a fear of their partner's parents as well.

The findings of this study have important implications for future studies. Throughout the research, cancer survivors experienced negative reactions, such as potential partners breaking contact with them after learning about their cancer history. The possible contributory factors to negative reactions toward cancer survivors are a lack of knowledge and stigma in society.<sup>80</sup> Thus, to reduce negative reactions toward survivors in society and to enable cancer survivors to safely



disclose their cancer experience and cancer-related feelings, it seems important to provide cancer educational interventions to society. Furthermore, hearing of experiences as in the quotes from interviews in this study directly from survivors could promote understanding and consideration for cancer survivors. Moreover, learning about the experiences of other survivors and strategies to cope with the challenging situation of forming romantic relationships after cancer diagnosis would be helpful to cancer survivors who are currently struggling. Finding a romantic partner is crucial to maintain the quality of life after cancer, but information regarding the impact of cancer and its treatment—which is necessary in the process of establishing romantic relationships and considering marriage after cancer—is difficult to obtain because of its personal and sensitive nature. Young cancer patients are hesitant to ask medical professionals about such information and support, as described in this study. Providing opportunities to hear other survivors' real-life stories would be useful for survivors who are concerned about new relationships post-diagnosis.

This study has several limitations. First, in their interviews, the majority of the participants reported being successful in establishing satisfactory relationships with romantic partners after diagnosis. Future research should include more survivors who have not successfully developed romantic relationships after diagnosis. Despite these limitations, however, we adequately explored the successful survivors' experiences of romantic relationships and marriage post-diagnosis, as most had experienced difficulties before their current relationships. Second,

this study is limited by a lack of information on cultural differences in family values regarding romantic relationships and marriage. Future studies could investigate the impact of cancer on this theme cross-culturally. Despite its it being merely an exploration, this study adds to our understanding of romantic relationships and marriage post-diagnosis in an Asian population. Third, the present study did not intentionally limit sexual orientation, but involuntarily resulted in a focus on heterosexual cancer survivors. However, people of varying sexual orientations may have unique challenges regarding romantic relationships after cancer diagnosis. Future research should address a more diverse range of sexual orientations and gender identities. Finally, the participants in this study had to answer the interview questions retrospectively; therefore, recall bias may have influenced the results. To minimize recall bias in future studies, the period between cancer diagnosis and interviews should be reduced as much as possible.

## **5. CONCLUSIONS**

The identification of cancer impacts on romantic relationships and marriages post-diagnosis in this study supports previous findings. However, the current study found that factors behind some of the impacts could be explained by socio-cultural influences in East Asia, where the choice of romantic and marriage partner is likely to be subject to parental influence. The results extend the existing knowledge of romantic relationships and marriage post-diagnosis in AYAs by attributing

experiences to an Asian population.

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## **AUTHOR DISCLOSURE STATEMENT**

No competing financial interests exist.

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## Appendix 1 Interview questions

- Did you have a partner when you were diagnosed with cancer? If relevant, how the cancer affected romantic relationships and/or marriage, regardless of positive or negative impact?
- Have you formed new relationship(s) after cancer diagnosis?
- How has your cancer history affected forming new romantic relationship and/or marriage, regardless of positive or negative impact (if any)?
- Are you worried about relationship in the future? How do you feel about it?

Accepted Version

**Table 1 Themes, categories, and exemplar quotes of cancer impact on romantic relationships and marriage post-diagnosis**

Theme	Category	Exemplar quotes	n
<b>Negative Impact</b>			
Fertility and parenthood concerns	● (Potential) infertility	“I would feel really sorry for my future partner. I have to tell her about my possible infertility when she says that she wants a child.” (Male, 25, Colon cancer)	11
	● Hesitant to have children due to cancer susceptibility gene mutations	“I am worried about my offspring developing cancer but positively thinking that I could marry without having children or marry a divorced man with children.” (Female, 31, Breast cancer)	
Disclosure of cancer history	● Disclosure to potential partners	“I have mixed feelings about having a relationship with him. I would like to get along with him, while I am also wondering if letting the friendship fade away would be better. If I come close to go out with him, I’ll have to struggle with problems such as when to tell him about my cancer history and the fear of rejection” (Female, 31, Breast cancer)	9
	● Disclosure to partners’ parents	“I worried that his parents might have a bad impression of me. I thought that they would more likely welcome a healthy daughter-in-law than one who suffered this disease.” (Female, 32, Breast cancer)	
Recurrence, metastasis, and poor health	● Recurrence	“Marriage is not an easy decision to make for me because of my higher health risk than my healthy peers.” (Male, 23, Testicular cancer)	6
	● Metastasis	“Marriage is a risky step for me because of my disease. What would happen to my family if I fell ill, became bedridden, and were outlived by them?” (Male, 27, Colon cancer)	
	● Poor health	“I wonder if I can live until the age of 40...I think I will die earlier than healthy people, so I would feel sorry for a future partner who would become a widow at a young age. I would tell her that she could marry again after I died, but I would still feel sorry about involving her in my cancer trajectory.” (Male, 25, Colon cancer)	
Changes to physical appearance		“When I consulted my physician about my hair, he did not take it seriously, saying that thin hair is a small matter as my life was saved.” (Male, 23, Testicular cancer)	5
		“I have upper body scars, so I had to tell my girlfriend about my cancer history before we went to the beach together.” (Male, 20, Testicular cancer)	



Negative response from potential partners and partner's parents	● Direct response	“After disclosing my cancer history to a guy whom I had been getting close to, I never heard from him again. After this happened, I wondered if I could no longer date someone.” (Female, 23, Gastric cancer)	5
	● Indirect response	“I heard of a cancer survivor who were abandonment by her partner because of her cancer diagnosis, whose husband was involved with another woman during hospitalization of his wife, and a survivor whose partner said ‘(cancer is) too heavy for me’ at the beginning of a new relationship.” (Female, 34, Breast cancer)	
Family reluctance	● Cancer survivor's family	“My sister said to me that she disagreed with me participating in matchmaking event since I would be let more people grieve over me, should they lose me as a family member, because of my cancer.” (Female, 31, Breast cancer)	4
	● Partner's family	“When we started to live together, his parents responded negatively, just as I thought they would. They seemed shocked because my infertility means that they could not have grandchildren.” (Female, 22, Leukemia)	
Sexual dysfunctions		“For me, the biggest hurdle in a post-diagnosis romantic relationship is the inability to obtain an erection. My physician said that sexual function would recover in five years, so I decided to undergo the surgery, but it has not returned.” (Male, 27; Colon cancer)	3
No room for romance		“All I can do is just to lead my life, thus I am not confident about caring for a partner.” (Male, 25, Colon cancer)	3
Decreased confidence in romantic relationships and marriage due to cancer history		“A matchmaking coordinator introduced me to online dating services and created a profile for me, saying that I have a bright personality even with a history of some disease, but I received fewer dating requests than others.” (Female, 22, Leukemia)	2
Positive impact		“The year I encountered the support group was the turning point of my life after cancer. I then became open about my cancer experience, which I had not even told my family about. I had given up finding a girlfriend before I met my current partner, but now I feel comfortable with her because we can share our cancer experiences.” (male, 27, colon cancer)	1
No impact		“My cancer had no impact on my relationship with the partner whom I met post-diagnosis, though I do not know how it would have been if we met during the period I was diagnosed and had to undergo surgery.” (Female, 31, Breast cancer)	2