

## Original Article

## The lived experiences of pregnancy planning after breast cancer in women of childbearing age: A phenomenological study

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## ABSTRACT

**Objective:** This phenomenological study aimed to explore the lived experiences of planning for pregnancy after breast cancer in women of childbearing age.

**Methods:** The study comprised 15 women with breast cancer who were considering pregnancy and childbirth. Individual in-depth interviews were conducted between November 2022 and March 2023, and the verbatim transcripts were analyzed using Colaizzi's phenomenological method.

**Results:** Four theme clusters emerged: (1) deepening desires amidst hardships, (2) endless worries about an uncertain future, (3) unveiling the meaning of having a child, and (4) perpetual deliberations regarding unresolved dilemmas. Over time, the participants' longing for children intensified, despite the contradiction of their reduced fertility. They expressed concerns about the potential risks and challenges of pregnancy in breast cancer patients, but they attributed value to having a child as a means to restoring their health, reclaiming their ordinary lives, and providing motivation for a healthier future. The participants found making decisions regarding pregnancy to be difficult and were often influenced by others.

**Conclusions:** This study underscores the unique challenges faced by women with breast cancer who are making fertility-related decisions. The findings contribute to a better understanding of these challenges and offer valuable insights for the development of decision aids that support shared decision-making for pregnancy after breast cancer.

## Introduction

Breast cancer is the most common cancer among women worldwide, and its incidence is increasing annually.<sup>1</sup> While breast cancer generally affects women who are over 50,<sup>2</sup> the incidence rate for women younger than 40 is nonetheless significant, accounting for approximately 4% of cases.<sup>3</sup> This means that 1 in 65 women is diagnosed with breast cancer before the age of 40.<sup>3</sup> In Korea, where this study was conducted, the rate of breast cancer among premenopausal women is notably higher than in Western countries.<sup>4</sup> This incidence highlights a growing population of women of childbearing age who are affected by breast cancer. With societal factors such as education, employment, and economic challenges leading to people marrying later in life,<sup>5</sup> increasing numbers of women are being diagnosed with cancer before getting married or considering pregnancy.

Breast cancer involves surgery, chemotherapy, radiotherapy, hormone therapy, and targeted therapy.<sup>6</sup> However, chemotherapy is toxic to

the reproductive glands and can cause ovarian dysfunction and premature menopause.<sup>7</sup> Additionally, hormone therapy can temporarily suppress ovarian function and induce temporary or permanent cessation of menstrual periods, possibly decreasing fertility.<sup>8</sup> The medications used in hormone therapy are also potentially toxic to developing fetuses.<sup>8</sup> Consequently, women are advised not to become pregnant during the treatment period, which could be long—up to ten years.<sup>9</sup> Treatments for breast cancer, as well as gynecological cancer, bone cancer, and malignant brain tumors, can cause significant fertility changes,<sup>10</sup> requiring heightened attention on and engagement with fertility issues.

From the time of diagnosis to survivorship, breast cancer patients experience ongoing psychological distress and endure negative emotions because of their potential loss of fertility.<sup>11,12</sup> They face significant challenges in making decisions about childbearing, experiencing feelings of fear, anxiety, and distress.<sup>13</sup> These challenges are further complicated by the sharp decline in female fertility with age.<sup>14</sup> While previous studies have reported no differences in survival rates based on pregnancy

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status,<sup>15</sup> patients often express concerns and fears about pregnancy because of breast cancer's hormonal nature.<sup>16</sup> Additionally, patients experience anxiety about the inevitable need for treatment delays or interruptions when attempting to become pregnant.

The importance of considering and addressing fertility and pregnancy issues in cancer patients, including breast cancer patients, has been increasingly recognized in recent years.<sup>17</sup> International guidelines recommend discussing fertility preservation with patients prior to cancer treatment and referring them to reproductive specialists if necessary.<sup>18</sup> However, as many studies have primarily focused on fertility preservation before treatment, concerns regarding reproductive health after treatment remain under-addressed.<sup>19,20</sup> Research should investigate the reproductive experiences of breast cancer survivors throughout their survivorship, including their desires, concerns, and what childbirth means to them, as well as the difficulties they encounter in their decision-making processes regarding pregnancy.

Therefore, this study aims to thoroughly explore the experiences of pregnancy planning after breast cancer for women of childbearing age. In this study, pregnancy planning refers to the "deliberate and strategic consideration of pregnancy, encompassing the entire process of pregnancy, childbirth, and parenting children, within the context of breast cancer survivorship." It provides valuable evidence for the development of interventions that support decision-making regarding pregnancy and childbirth in premenopausal breast cancer survivors, ultimately contributing to enhancing the quality of life of both the survivors and their families.

## Methods

### Design

This phenomenological study was conducted to understand and describe the lived experience of women of childbearing age planning for pregnancy after breast cancer.

### Participants and setting

Participants for this study were recruited through online communities of breast cancer patients. Purposive sampling was employed, and the inclusion criteria for the study were women (1) between 18 and 45 diagnosed with breast cancer; (2) who had completed active treatment (surgery, chemotherapy, and radiotherapy); (3) who had had discussions with healthcare providers about pregnancy, or actual plans or attempts to conceive; and (4) who were in good general health with no evidence of further metastasis or recurrence. Those diagnosed with or treated for conditions other than breast cancer that affected their fertility, such as gynecologic conditions, were excluded.

With the cooperation of community managers, we posted a participant recruitment document summarizing the study's purpose, methods, and eligibility requirements. Individuals interested in participating contacted the researchers via mobile phone and, provided their contact information. The researcher then selected participants by determining whether they met the inclusion criteria. In total, 17 women volunteered to participate, although two were subsequently excluded: one who did not meet the inclusion criteria, and one who was excluded due to loss of contact. Therefore, 15 women in total participated in the study.

### Data collection

Data were collected through individual in-depth interviews conducted between November 2022 and March 2023. Given the COVID-19 situation and the geographical distribution of the participants, interviews were conducted via Zoom or phone, depending on participant preference. The first author, who is female and has expertise in breast cancer nursing and qualitative research, conducted the interviews. Each was interviewed in a single session, lasting approximately 90 min.

Over the course of two research meetings, the researchers developed semi-structured interview questions based on existing literature regarding fertility, pregnancy, and childbirth in women with breast cancer. The interview questions, which included probing questions aimed at obtaining more in-depth information on specific topics, were refined and modified as necessary during the interviews (Table 1). Open-ended questions and empathic responses were used to allow participants to openly discuss their experiences and feelings.

Following each interview, the researcher reviewed the interview summary with the participant to ensure that the researcher's understanding reflected the participant's experience accurately and without distortion. After conducting and reviewing the interviews with all 15 participants, it was determined that sufficient data had been collected to explain and interpret the phenomena being studied, and no new themes were emerging. Therefore, all researchers agreed that theoretical saturation had been reached and ended the interviews.

### Data analysis

The data were manually using Colaizzi's phenomenological approach.<sup>21</sup> First, the interview transcripts were reviewed to gain a comprehensive understanding of the data as a whole. Two researchers then repeatedly read the transcripts to capture the conveyed meanings. Statements that were thought to represent essential meanings were extracted, while more abstract and universal meanings were derived from them. We selected and categorized themes from among these meanings that encompassed the participants' experiences and consolidated them into theme clusters based on their similarities. To ensure the findings accurately reflected the participants' experiences, the transcripts were reread, and the phenomena were described within the structure of the themes and theme clusters using the participants' own statements. We revised the four theme clusters and 13 themes by eliminating redundant descriptions from the overall structure.

The first author conducted the primary data analysis, and all researchers finalized the analysis by reviewing and refining the content over ten research meetings.

### Research rigor

This study endeavored to achieve research rigor based on truth value, applicability, consistency, and neutrality.<sup>22</sup> First, to ensure truth value, we purposefully selected participants who could eloquently describe the research phenomena and encouraged them to express themselves freely. To minimize data omissions and distortions, the interviews were transcribed verbatim. Second, we presented the participants' general and

**Table 1**  
Overview of interview questions.

- 
- What were your plans regarding pregnancy from the time of your breast cancer diagnosis until now?
    - (P) If there were any changes in your plans, what were the reasons behind them?
  - When making plans for pregnancy, what did you consider to be most important?
    - (P) Did the breast cancer diagnosis or treatment lead you to consider anything specific? If so, did it influence your pregnancy plans?
  - If you were to successfully conceive and give birth, what changes do you anticipate in your life?
    - (P) What significance do pregnancy and childbirth after breast cancer diagnosis hold for you and your family?
  - What was your experience like during your pregnancy-related decision-making process?
    - (P) If you encountered any difficulties during the decision-making process, what were they? How did you handle them?
  - Did you have any discussions about your pregnancy plans with your family or healthcare professionals?
    - (P) If you experienced differences of opinion or conflicts, what were they? How did you handle them?
- 

P, probing questions.

disease-related characteristics in order to enhance the applicability of our findings. Third, to ensure consistency, we adhered to Colaizzi's research methodology when analyzing the data, drawing conclusions, and detailing the entire research process. Finally, to establish neutrality, we remained neutral and tried to analyze the participants' perspectives to the best of our abilities.

**Ethical considerations**

This study was approved by the Institutional Review Board of the researcher's institution. Participants were fully informed, in advance, of the study's purpose and methods, and were assured that they could withdraw at any time. Written consent was obtained via email. The interviews were recorded with the participants' consent, and each participant's personal information was encoded in the transcript to ensure anonymity. After the interview's completion, a small compensation was provided to the participants.

**Results**

Of the 15 women who participated in the study, two participants were engaged, and the rest were married. Regarding the number of children at diagnosis, seven participants had one child each, and the remaining eight participants were childless. The time since diagnosis ranged from one to 12 years, with an average of 3.87 years. At the time of diagnosis, seven participants had stage I breast cancer, six had stage II, and two had stage III. Participants received different treatments based on their cancer type. Over the past six months, five participants reported regular menstrual cycles, one had an irregular cycle, and nine were experiencing amenorrhea. Among the 15 participants, two gave birth to one child each after breast cancer (Table 2).

Through the use of phenomenological methods to analyze the lived experience of pregnancy planning among women of childbearing age diagnosed with breast cancer, 13 themes emerged, which were then consolidated into four theme clusters with more abstract and comprehensive meanings (Table 3). Fig. 1 presents the distribution of each theme cluster and themes in participants by frequency.

*Theme cluster 1: Deepening desires amidst hardships*

This theme cluster encompasses the growing desires for pregnancy among participants facing the challenges posed by breast cancer and its treatment. Participants who had delayed their pregnancy plans because of breast cancer experienced a greater longing to conceive with time, particularly considering their expected declines in fertility.

**Table 2**  
Demographic and disease-related characteristics of the participants.

No.	Age (years)	Marital status	No. of children at diagnosis	Time since diagnosis (years)	Cancer stage	Cancer treatment <sup>a</sup>	Menstrual pattern	No. of post-diagnosis children
1	34	Engaged	None	2	II	CTx, RTx, HTx, TTx	Amenorrhea	None
2	36	Married	One	2	I	CTx, RTx	Regular	None
3	43	Married	One	12	III	CTx, TTx	Regular	One
4	34	Married	None	2	I	CTx, RTx, HTx, TTx	Amenorrhea	None
5	39	Married	One	6	I	CTx, RTx	Regular	None
6	44	Married	One	5	I	HTx	Irregular	One
7	32	Married	None	6	II	CTx, RTx, HTx	Amenorrhea	None
8	34	Married	None	3	II	CTx, RTx	Regular	None
9	39	Married	None	7	I	CTx, HTx, TTx	Regular	None
10	37	Married	One	2	II	CTx, RTx, HTx	Amenorrhea	None
11	39	Married	One	6	III	CTx, RTx, HTx	Amenorrhea	None
12	35	Married	None	2	I	CTx, RTx, HTx	Amenorrhea	None
13	33	Engaged	None	1	II	RTx, HTx	Amenorrhea	None
14	29	Married	None	1	II	CTx, RTx	Amenorrhea	None
15	32	Married	One	1	I	HTx	Amenorrhea	None

CTx, chemotherapy; HTx, hormone therapy; RTx, radiotherapy; TTx, targeted therapy.

<sup>a</sup> Supplementary treatments to breast cancer surgery.

**Table 3**  
Theme clusters and themes on the lived experience of pregnancy planning after breast cancer.

Theme clusters	Themes
1. Deepening desires amidst hardships	(1) Suppressed longings in a life-threatening crisis (2) Paradoxical yearning for the impossible (3) Intensifying passion as time unfolds
2. Endless worries about an uncertain future	(1) Persistent fear of recurrence in pregnancy (2) Heightened anxieties about their child's health (3) Concerns about the physical challenges of parenting (4) Lifelong responsibility for a child
3. Unveiling the meaning of having a child	(1) Symbol of health triumphing over illness (2) Resuming an ordinary life, like other women (3) Driving force toward a healthier life
4. Perpetual deliberations regarding unresolved dilemmas	(1) Grappling with life-altering decisions (2) Constant struggles in juggling priorities (3) Undermined self-determination by external influences

*Theme 1: Suppressed longings in a life-threatening crisis*

Participants experienced difficulties regarding their pregnancy planning because of their sudden breast cancer diagnosis. Some of the participants were unmarried at the time of their diagnosis and had not made specific plans for having children, leaving them with no opportunity to consider family planning before starting treatment. Given the urgent and life-threatening nature of the illness, those who were actively planning or attempting to conceive had to set aside their desire to have children and prioritize their treatment. In other words, participants' aspirations for motherhood took a back seat to the pressing demands of breast cancer.

*Originally, my goal was to get married this year and have a child next year, but all those plans completely crumbled away (with my cancer diagnosis). (P13)*

*While actively trying to have a child, I was diagnosed (with breast cancer). At that time, it was a matter of life and death. I had no choice but to put aside any thoughts of having a child. (P10)*

*Theme 2: Paradoxical yearning for the impossible*

Participants were aware that their breast cancer treatment could adversely impact their fertility, making conception challenging. This led to profound concerns regarding their ability to conceive and reinforced their longing to have children, not only among those who had previously planned for motherhood but also among those who had not yet considered or made specific plans. Even among participants who

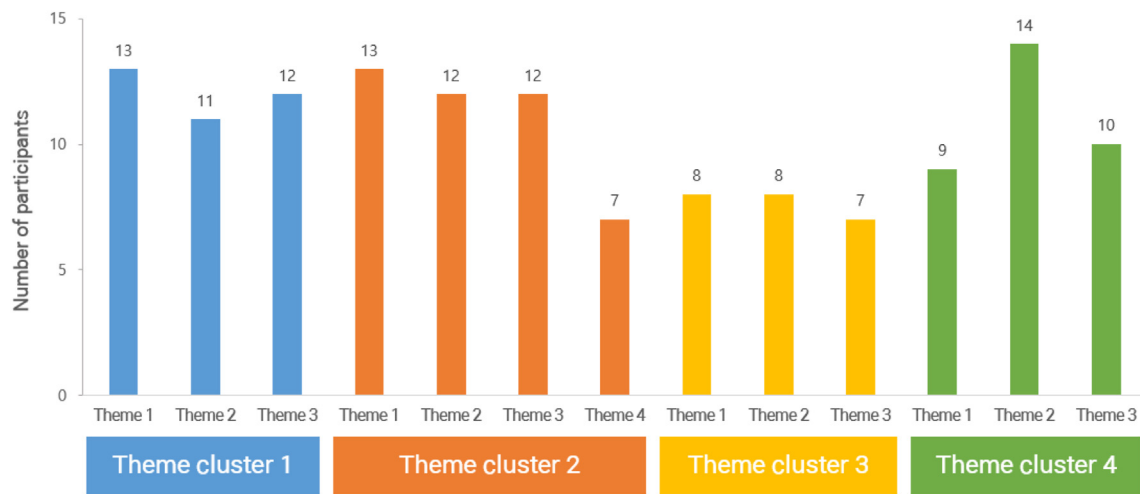


Fig. 1. Distribution of theme clusters and themes among women of childbearing age with breast cancer.

had not initially intended to have children, the prospect of diminished fertility triggered their worries and prompted them to reconsider. Thus, participants paradoxically developed a strong desire to have children, despite their reduced ability to conceive.

*My doctor recommended an oophorectomy because I have the BRCA mutation, which would mean I could no longer conceive a child. My longing to have a child grew even stronger. There is a big difference between not having a child and not being able to have one. (P2)*

*When I was told about the difficulties of having a child, it actually fueled my desire. It's like the more I think about not being able to have a child, the more I want one. (P11)*

**Theme 3: Intensifying passion as time unfolds**

Once participants had completed their active treatment, their physical and mental health gradually began to improve, and they naturally believe that they were now able to pursue motherhood. As they witnessed their peers starting their own families, their desire to have children intensified. However, as they endured noticeable physical changes, such as the absence of menstrual periods, they harbored fears of infertility or premature menopause. Anticipating further declines in fertility as time passed, they felt compelled to conceive while they were relatively youthful. The idea that their window of fertility was limited fueled their growing impatience and desperation, which was particularly noticeable among older patients.

*Over time, I gradually became more relaxed and felt that I could have a healthy child. I thought that I couldn't wait any longer. My periods had gotten much lighter, my ovarian reserve appeared older than my actual age, which was almost 40. (P5)*

*I'm getting impatient because I can definitely feel my body deteriorating. The thought of not knowing how long my fertility will last makes me feel even more anxious. (P9)*

**Theme cluster 2: Endless worries about an uncertain future**

This theme cluster captures the concerns of the participants surrounding the uncertainties associated with pregnancy in women with breast cancer. Participants worried about the potential impact of

pregnancy on their own health and their children's health, as well as their ability to successfully fulfill their parenting responsibilities after childbirth.

**Theme 1: Persistent fear of recurrence in pregnancy**

Participants expressed concerns about the potential risks of breast cancer recurrence during pregnancy, considering the role that hormones play in the disease. They feared undergoing another grueling course of treatment or facing a life-threatening situation if their breast cancer returned. The participants were also anxious about using hormonal medications for fertility interventions because of the potential carcinogenic risk. Women with hormone-positive breast cancer felt even more vulnerable to pregnancy's hormonal changes. Participants also raised concerns about the challenges of self-examination given breast changes in pregnancy, as well as the limited availability of precise diagnostic tests such as mammograms, computed tomography (CT), or magnetic resonance imaging (MRI) scans for early detection of breast cancer recurrence.

*Since pregnancy and childbirth involve hormones, I feel a little scared, anxious, and worried about the changes that may happen in my body. (P13)*

*What if I got cancer while I'm pregnant? There are only limited definitive tests because of their possible risks to the fetus. A whole year could go by without accurate tests. That makes me more and more anxious. I don't know what might happen during that year. (P14)*

**Theme 2: Heightened anxieties about their child's health**

Participants were deeply concerned about the health of their future children. Women with the BRCA mutation have a 50% chance of transmitting the mutation. Even participants without a history of hereditary breast cancer were worried about their children developing breast cancer or other diseases because of their family history or other environmental factors. They also expressed their anxieties about the potential long-term effects of the medications used in their cancer treatments on their children's health. The mere thought of their children suffering because of their own health conditions inflicted almost unbearable anguish upon the participants. They anticipated that if their child were to be born with health issues, they would feel responsible, and would experience overwhelming feelings of guilt.

*I don't have the BRCA mutation, but I'm still anxious that my child will get breast cancer or another cancer. My husband is healthy—I'm the only one who's had health issues—so I can't help but feel like if my child gets sick in the future, it would be my fault. (P14)*

*I'm worried about my child being born with abnormalities because of the treatment I received. I'm not sure whether I could handle that. It really scares me. (P11)*

### Theme 3: Concerns about the physical challenges of parenting

Participants expressed concerns about the physical demands and strain associated with childcare. Breast cancer surgery commonly involves axillary lymph node biopsy or dissection, which can potentially result in lymphedema. Although participants acknowledged the possibility of breastfeeding with their unaffected breast, they anticipated practical obstacles. Furthermore, they feared that their breast cancer history could pose risks to their child's health even if they could breastfeed. Participants were particularly concerned about their inability to provide breast milk with essential nutrients, which could impact their child's growth and development.

*I can't lift heavy things on the side where I had my surgery, so carrying my child will be hard. Parenting is so physically demanding that I worry it might strain my body and damage my health. (P12)*

*I'm most concerned about whether I can breastfeed properly. I'm afraid that if I breastfeed, my baby will take in the cancer cells that are left in my breast. (P5)*

### Theme 4: Lifelong responsibility for a child

Participants' concerns about their health were amplified by the lifelong responsibility that comes with having children. They feared that their illness would impede their ability to adequately care for their children and that they would ultimately become a burden to them. The thought of them potentially dying because of cancer recurrence and having to leave their children behind added to their concerns about fulfilling their parental responsibilities. These thoughts also led them to reflect on whether having children would impose a hardship on themselves and their families. Conversely, some participants who already had one child expressed a strong desire to have another child since they wanted their existing child to experience the lifelong companionship of siblings.

*I'm afraid that my cancer will come back or metastasize in the future, and I won't be able to care for my child. Honestly, when it's just about my own health, I might not feel as worried. But when I consider having a child, these concerns become even greater. (P1)*

### Theme cluster 3: Unveiling the meaning of having a child

This theme cluster portrays what it means to the participants to successfully conceive and give birth to a child after being diagnosed with breast cancer. They anticipated that pregnancy and childbirth would be evidence of them returning to health, enabling them to lead a normal life, like other women and move toward a healthier future.

#### Theme 1: Symbol of health triumphing over illness

Participants envisioned that having a child after overcoming the challenging journey of breast cancer would hold profound significance. They perceived giving birth as being powerful and tangible evidence of conquering the disease, symbolizing the restoration of their bodies and allowing them to leave their past illness behind and move beyond a life dominated by treatment. The arrival of new life was viewed as a miraculous event, evoking feelings of deep gratitude and providing an opportunity to regain faith and confidence in their own health. Participants

felt that any child that was born safely amid such adversity, would be held and cherished with even greater affection.

*It would be totally different to live a life focused solely on treatment and recovery. The birth of another life within me is a testimony to and symbol of my health. (P3)*

*In 2017 (at the time of my breast cancer diagnosis), there were moments when I wondered if I would live beyond 2020. If I were to overcome such a huge obstacle and realize my desire to have a child, it would be incredibly moving and fulfilling. (P7)*

### Theme 2: Resuming an ordinary life, like other women

Participants acknowledged that giving birth was a unique and precious experience and symbolized the fulfillment of their role as women and the continued pursuit of happiness. They believed that embracing the opportunity to have children and nurture a family, despite their illness, would enable them to lead a normal life, like other women. For those who had previously doubted their ability to conceive because of breast cancer, the prospect of experiencing healthy childbirth served as a catalyst for restoring their confidence in their innate capacity as women. These aspirations held immense meaning for participants as they sought to reclaim their fulfilling lives as ordinary women.

*I want to have children, raise them well, and live just like everyone else. I feel like I can live a normal life, putting aside the fact that I had this illness (breast cancer). (P1)*

*I thought my life as a woman was over (because of breast cancer). Having a child after treatment would give me a sense of relief and ease my worries. (P14)*

### Theme 3: Driving force toward a healthier life

The participants believed that having a child would bring tremendous happiness and joy to themselves and their families and would bring extra vitality to their lives. They perceived that the presence of a beloved child would enhance their emotional and physical well-being, triggering a shift toward a more positive mindset and optimistic outlook for the future. Moreover, they viewed having a child as an opportunity to take better care of their own bodies so they could be present with the child throughout their cherished child's lifetime. Participants recognized this chance to underscore the importance of health and reinforce their commitment to managing it.

*I firmly believe that my child came into my life because I became healthy enough to raise him. This belief encouraged a positive mindset and prompted me to prioritize my health for my child's sake. Having a child became the motivation for a healthy life, and it also brought me joy and happiness. (P3)*

### Theme cluster 4: Perpetual deliberations regarding unresolved dilemmas

This theme cluster encompasses the challenges experienced by participants during the decision-making process regarding pregnancy after breast cancer. Participants perceived pregnancy in the context of breast cancer as a difficult decision and one which involved risks. They confronted hardships in prioritizing their health and pregnancy and were often influenced by people around them. Consequently, participants found it difficult to make decisions.

#### Theme 1: Grappling with life-altering decisions

Having a child was seen to pose a monumental challenge in the lives of the participants. The potentially life-threatening nature of pregnancy

after breast cancer made it feel like a daring venture where they had to endanger their own lives for the birth of a new life, as opposed to the normal developmental step it seemed to be for healthy people. For those with hormone receptor-positive breast cancer, interrupting their hormone therapy to pursue pregnancy instilled a sense of dread akin to releasing a “lifeline.” Embarking on the pregnancy journey required immense courage, intensifying the complexity of the decision-making process.

*I think it's a tremendous commitment to risking my life. I have to try to get pregnant with the fear of possible recurrence or metastasis. (P10)*

*If I can reduce my risk of metastasis or recurrence by even 1%, I'm willing to do whatever it takes, no matter the side effects. For a breast cancer patient, the decision to give birth, which potentially poses a greater risk, is truly a life-and-death decision. I think it's completely different from how a healthy woman experiences pregnancy and childbirth. (P13)*

### Theme 2: Constant struggles in juggling priorities

Participants faced a nonstop battle when balancing the potential physical risks of pregnancy against the joy of childbirth, and coming to a decision was often challenging. Some participants chose to prioritize their own health, taking sufficient time to minimize physical strain, even if this reduced their chances of becoming pregnant. Others, however, worried about the potential regret of not trying to conceive, despite the possibility of unsuccessful attempts and potential health issues during pregnancy. The ongoing internal conflict caused anguish and frequent changes of mind during the decision-making process. As time passed, their concerns deepened, leading to delays in or reconsideration of their choices without a clear resolution.

*I don't know if I should prioritize my treatment or childbirth—I'm torn 50/50. I feel that focusing on my treatment should come first because if I'm not alive, then my child won't exist either, but it's still a worrying and hard decision. (P15)*

### Theme 3: Undermined self-determination by external influences

During family planning, participants encountered conflicting opinions. Some participants were advised strongly by medical professionals to focus on their treatment rather than consider pregnancy, leading them to abandon their desire to have a child. Family members would also express concerns about the risk of relapse and even discouraged them from having children. More specifically, participants who already had children were viewed as greedy and were criticized for their decision to have more children. Conversely, despite their own reluctance regarding health risks, some participants felt compelled to plan a pregnancy in response to the expectations and persuasions of their spouse or other family members. The intrusion of others in their family planning left participants feeling powerless and frustrated, as if they had lost control over their own choices.

*I wonder why others (family and doctors) discourage me from having children when it's something I really want. It's frustrating—this is my life, but I can't decide for myself. (P11)*

*I'm considering pregnancy because I feel sorry for my husband. Although he says it's O.K. even if we don't have a child, I honestly sense his desire. Even my mother says she hopes we have a child soon. (P1)*

## Discussion

This study attempted to explore the lived experience of women of childbearing age who are planning for pregnancy after surviving breast cancer. Qualitative interviews with 15 participants revealed four theme clusters: (1) deepening desires amidst hardships, (2) endless worries about an uncertain future, (3) unveiling the meaning of having a child,

and (4) perpetual deliberations regarding unresolved dilemmas.

Theme cluster 1 represents the increased desires among the participants to conceive as time progresses after breast cancer. Participants tended to prioritize treatment over family planning at diagnosis, delaying pregnancy planning until their fertility had already declined because of gonadotoxic treatment. Recently, fertility-preservation methods, such as oocyte, embryo, and ovarian tissue cryopreservation, have shown promise in improving fertility outcomes<sup>23</sup> and have provided breast cancer patients with a sense of control and hope.<sup>24</sup> However, only a minority of patients pursued these options because of a lack of information,<sup>25</sup> despite international guidelines recommending the incorporation of fertility preservation in breast cancer care.<sup>18</sup> Therefore, it is crucial that comprehensive information is readily available so that patients can make optimal decisions about their fertility. It is also important for both patients and healthcare providers to recognize that pregnancy intentions may change over the course of their disease.

Chemotherapy and hormone therapy often disrupt and delay menstruation, leading to uncertainty about whether the cycle will resume during treatment. Furthermore, the resumption of menstruation does not guarantee the restoration of fertility, which was a further source of anxiety for the participants. Studies have shown that more than 50% of women with breast cancer fear infertility after treatment<sup>26</sup> and tend to overestimate their risk of becoming premenopausal.<sup>27</sup> Cancer-related infertility also has a significant psychological impact, reducing the quality of life.<sup>28</sup> Therefore, conducting fertility assessments, providing patients with information about their fertility prospects, and offering consultations with a gynecologist if needed can all help patients understand and anticipate their fertility status, and can ultimately reduce anxiety.

Theme cluster 2 represents participants' worries about pregnancy after breast cancer. Participants expressed significant concerns about an increased risk of cancer recurrence associated with pregnancy, as well as higher risks of fetal abnormalities and cancer development. However, breast cancer studies have shown that women who became pregnant had better survival outcomes compared with those who did not have a subsequent pregnancy,<sup>29,30</sup> with no significant increase in the risk of congenital abnormalities or other reproductive complications.<sup>29</sup> Given the limited reproductive health information received by breast cancer survivors and their desire for realistic expectations regarding conceiving after cancer,<sup>31</sup> it is crucial that misconceptions about pregnancy after breast cancer are addressed. Additionally, offering patients appropriate testing for breast cancer surveillance and regular psychological counseling during conception attempts or pregnancy can help alleviate psychological distress and facilitate the early detection of any health risks.

Participants believed that they were risking their lives by attempting to become pregnant because of a perceived risk of cancer recurrence. Participants with hormone-positive breast cancer were sensitive to hormonal changes, and discontinuing hormone therapy for pregnancy was a significant burden for them. However, studies have shown no difference in disease-free survival rates between pregnant and non-pregnant patients, regardless of hormone receptor status.<sup>32</sup> Additionally, patients receiving both endocrine therapy and chemotherapy had a better prognosis in the pregnant group compared with the non-pregnant group.<sup>30</sup> Recently, an international prospective study on the discontinuation of endocrine therapy for pregnancy attempts in hormone-positive breast cancer has been conducted.<sup>17</sup> The results of the international prospective study will provide valuable insights for decision-making in women with breast cancer.

Theme cluster 3 represents the meanings attributed by participants to becoming pregnant and giving birth after breast cancer. The participants believed that having a child would restore their health and enable them to live a normal life like other women. This belief aligns with previous research indicating that having a child can reestablish a sense of normal femininity and sexuality.<sup>33</sup> Moreover, the participants perceived childbirth as a driving force for a healthier life, consistent with the study

suggesting that raising a child can serve as a powerful motivator for breast cancer survivors to stay alive and maintain their health.<sup>20</sup> These positive motivations for childbirth among women with breast cancer, along with the “healthy mother effect,” which suggests that only women who feel healthy give birth,<sup>34</sup> may contribute to improved health outcomes in pregnant women. Therefore, despite the potential risks, childbirth itself appears to hold a positive meaning for women with breast cancer.

Theme cluster 4 represents the difficulties the participants experienced in the pregnancy decision-making process. Participants faced challenges in determining their priorities regarding family planning, meaning that decision aids for shared decision-making about pregnancy in breast cancer patients need to be developed urgently. Participants expressed frustration that conflicting opinions from healthcare professionals and family members undermined their right to self-determination, a result which aligns with concerns among many physicians about the potential negative impact of pregnancy on the prognosis of breast cancer survivors.<sup>35</sup> Previous research has shown that breast cancer patients often felt their fertility concerns were inadequately addressed, indicating a lack of effective communication between healthcare providers and patients.<sup>27</sup> Therefore, healthcare professionals should consider patients’ fertility<sup>28</sup> and promote open communication to empower them as active decision-makers. Providing opportunities for coordinating family decisions can also help optimize decision-making.

Interestingly, participants who already had a child expressed a strong desire to provide their children with siblings after their breast cancer diagnosis. This finding contrasts with previous research findings, which suggested that women without children are more willing to assume the risk of having a child.<sup>36</sup> In Korea, where this study took place, the birth rate has been steadily declining, with a very low total fertility rate of 0.84 per woman in 2022.<sup>37</sup> Given the prevailing belief that having children diminishes the desire for more, participants who already had a child reported pressure from healthcare professionals advising against expanding their family further. As emphasized in the meta-synthesis of fertility decision-making among women with breast cancer,<sup>38</sup> healthcare providers should eliminate assumptions and biases about fertility decisions during their consultations with patients.

#### Strengths and limitations

This study conducted a thorough exploration of the pregnancy planning experiences of women of childbearing age diagnosed with breast cancer. This study is significant in that it includes the positive aspects and meanings of having children for breast cancer survivors, in contrast to previous studies that primarily focused on concerns about pregnancy-associated outcomes and decision-making difficulties.<sup>13,39</sup>

However, this study also has several limitations. First, decision-making regarding pregnancy can vary depending on the sociocultural environment, the level of healthcare technology, and the support systems of the people involved. Second, most of the participants were generally in their late childbearing years, had considered having children, and were either married or in a committed relationship. Additionally, only two of the participants had actually given birth after their breast cancer diagnosis. Consequently, the findings of this study may not fully represent the experiences of all women of childbearing age with breast cancer.

More research targeting women with breast cancer in various settings and a diverse range is therefore necessary. Future studies should include younger age groups or women who have neither spouses nor intend to have children, as well as more women who have given birth after their breast cancer diagnosis. Future research studies like these will contribute to obtaining a more comprehensive understanding of the given phenomena. However, since the participants in this study are likely to be the target population for future fertility-related interventions, the findings will provide valuable insights for developing such interventions.

## Conclusions

This study explored the lived experience of pregnancy planning in women of childbearing age with breast cancer. Despite a strong desire to have children after breast cancer treatment, women of childbearing age encountered difficulties in decision-making because of the potential risks of pregnancy and the significant meaning they attributed to having children. These study results contribute to a better understanding of fertility-related decision-making among women with breast cancer, ultimately providing support for their decisions and improving the quality of life for both them and their families. Further research is needed to develop decision aids for shared decision-making about pregnancy after breast cancer by drawing on repeated studies involving participants with diverse sociocultural backgrounds and various characteristics.

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## CRediT author statement

**Jeonghee Ahn:** Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Writing – Original draft, Writing – Review & Editing, Supervision, Funding acquisition, Project administration. **Jeehee Han:** Methodology, Investigation, Formal analysis, Writing – Original draft, Writing – Review & Editing, Funding acquisition. All authors had full access to all the data in the study, and the corresponding author had final responsibility for the decision to submit for publication. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

## Declaration of competing interest

The authors declare no conflict of interest.

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## Ethics statement

This study was conducted after obtaining approval from the Research Ethics Review Committee of University of Ulsan (IRB No. 1040968-A-2022-009). All participants provided written informed consent.

## Data availability statement

The data that support the findings of this study are available from the first author, upon reasonable request.

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