

# Oncofertility care: A qualitative study to understand personal perspectives and barriers in the multidisciplinary breast care team in Taiwan

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## Abstract

**Background:** Previous studies indicate significant gaps exist in current practices and perceptions of oncofertility care.

**Objectives:** We aim to understand the clinical experience regarding oncofertility care among health providers in a multidisciplinary breast care team.

**Methods:** A qualitative, descriptive study was conducted. Data were collected through in-depth interviews with 16 health care providers who worked in a hospital in Taipei. Verbatim transcriptions were analyzed using constant analysis methods.

**Results:** Health care providers' experiences regarding fertility care for reproductive-age women with breast cancer were divided into two themes: personal perspectives and barriers. Personal perspectives consisted of six subthemes including empathizing with the patient's suffering during the diagnosis and treatment, safety as a prerequisite, satisfying the women's needs, respecting the women's choice, questioning women's ability to raise children, and returning to family life. There were also six subthemes under barriers. These subthemes were poor communication among the multidisciplinary team, lack of initial screening, insufficient support in the women's families, treatment considerations, lack of evidence-based information regarding oncofertility, and non-follow-up protocol.

**Conclusion:** Nurses should evaluate the fertility needs of women with cancer and identify potential gaps during oncofertility care. Education strategies and tactics should be improved in order to overcome difficulties arising from health care providers' personal perspectives and barriers to the provision of optimal fertility care in women with cancer.

## Keywords

breast cancer, multidisciplinary care, oncofertility

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## Introduction

More than 45,000 women below the age of 50 were diagnosed with invasive breast cancer in the United States in 2019.<sup>1</sup> In Taiwan, the incidence of breast cancer in women of childbearing age (15–49 years) is also increasing.<sup>2</sup> Most women with breast cancer receive hormone treatment or chemotherapy. These oncologic treatments have significantly improved survival, but frequently result in loss of fertility.<sup>3</sup> The impact of gametotoxic chemotherapies on the ovary is well reported, but even treatments that are reputedly not toxic to ovarian reserve can have a negative impact on future fertility. For example, although women treated with tamoxifen do not appear to experience a treatment-related diminution in ovarian reserve, nevertheless they were still less likely to have a child after their breast cancer diagnosis than were patients who had never used tamoxifen.<sup>4</sup> Overall, a Swedish study has reported that young breast cancer survivors were 27% less likely to give birth than were women in the general population.<sup>5</sup> The majority of young women with breast cancer would like to be informed about reproductive protection related to cancer treatment; however, several studies have demonstrated that the provision of such information is frequently inadequate.<sup>6–9</sup> Cancer-related infertility may have serious psychological consequences and reduce the quality of life of young women with breast cancer.<sup>8,10,11</sup>

Oncofertility bridges oncology and reproductive research to explore and expand options for the reproductive future of cancer survivors. Oncofertility care is interdisciplinary, requiring collaboration among reproductive medicine and oncology teams.<sup>12</sup> The fertility care of reproductive-age patients undergoing cancer treatment includes and requires the active participation of registered nurses and other allied health professionals in the counseling and education process, as first expounded by the American Society of Clinical Oncology in 2013.<sup>13</sup>

Health care professionals involved in oncofertility have gradually accepted and participated in protocols to provide advanced fertility care to reproductive-age women with cancer. A survey in the Netherlands showed that of all oncology nurses, one-third had sufficient knowledge of fertility preservation but at the same time more than one-fourth of all oncology nurses never discussed the topic with patients. The reasons for not discussing it included lack of domain knowledge, poor prognosis, and lack of time.<sup>14</sup> Other studies also show that health care staff lacked training in fertility preservation.<sup>7,15</sup> Clinical nurses mentioned fertility preservation counseling was important for women with cancer, but felt it was outside the scope of their practice to provide this education.<sup>13</sup> Significant gaps remain to be filled in clinical practices and the role of oncology nurses regarding the assessment of fertility needs and education of fertility preservation.

Oncofertility care requires the collaboration of different health professionals. A study in Portugal reported that while most oncologists discussed fertility issues with their patients, some clinicians reported never informing or discussing the risk of infertility or fertility preservation. Barriers preventing clinicians from informing patients about cancer-related infertility and fertility preservation included limited time, lack of communication skills, and patient-related factors.<sup>16</sup> Many physicians also expressed discomfort in asking women to stop endocrine therapy.<sup>17</sup> For Indian gynecologists, the reasons for not referring patients for fertility consultation included lack of interest in fertility preservation, lack of available fertility preservation services in the city, lack of knowledge about where fertility services were available, and the high cost of fertility services.<sup>18</sup> Alongside the clinical team, social workers can also play an important role in discussing fertility preservation resources. However, there is still a need to develop educational interventions and to help facilitate discussions with patients.<sup>19</sup> Overall, the poor quality of fertility preservation care could be due to patients' attitudes, health beliefs and health literacy, clinicians' approaches and skills with doctor–patient relationships, fertility resources, and institutional characteristics.<sup>20</sup>

To guide health care professionals in appropriate, safe, and cost-effective fertility care for women who desire to have children, we convened an interdisciplinary fertility preservation team to explore fertility issues. We also explored the cultural differences regarding fertility and infertility and traditional medicine. Therefore, the purpose of this research was to understand the dilemma of implementing oncofertility care among health professionals who care for women undergoing breast cancer treatment in Taiwan.

## Methods

### Design

We adopted a qualitative research design to explore health care providers' experiences with fertility care for women under treatment for breast cancer. In-depth interviews were used to collect and gain deep insights into the views of the participants. Ethical approval was obtained from the institutional review board in the study hospital.

### Participant selection and recruitment

Participants were recruited from a hospital in Taipei between August 2017 and February 2018. Health care providers who were aged 20 years or more, who worked in the hospital, who had medical-related certification, who had experience caring for reproductive-age women with breast cancer, and who could communicate in Chinese were included in the study. Health care workers with previous

psychiatric disorders, which could influence the experience of caring for cancer patients, were excluded. The research team in the hospital initiated contact with potentially eligible participants by telephone to introduce the study and elicit willingness to participate. Nurses were the first line of contact with the patients. Since fertility care of women with breast cancer involved interdisciplinary cooperation, we also recruited doctors from the surgical department and the obstetrics and gynecology department to increase the heterogeneity of the sample. Face-to-face interviews with the health care workers were arranged after confirming consent.

### Data collection

A semi-structured interview questionnaire was developed to collect data based on the experiences of the researchers in the field of oncofertility and upon an extensive review of relevant literature. Questions in the interview guide included the following:

What is your perception of pregnancy among women with cancer? What is your care experience regarding women with cancer and a desire for children? When and why did cancer women want to get pregnant? What are the considerations under which you would help them with fertility preservation or becoming pregnant?

In order to explore the real consideration and experience regarding oncofertility care, all interviews were conducted by the first and second authors from a medical college.

The interviews were scheduled at a time and place convenient to the participants, in a mutually agreed upon private setting. Each interview took about 60–120 min. The interviews were recorded using an audio recorder. We transcribed the recordings verbatim within 1 week. Data analysis was completed within the following 2 months. The researcher called the participants to clarify the contents of the interviews if needed. Data were analyzed until theoretical saturation.

### Interpretation of data

First, the data collected through the face-to-face interviews were transcribed from audio recordings to written transcripts. The content analysis method was used to analyze the data. Two researchers with training in qualitative study read the transcript independently line by line, coded the meaningful words, and conceptualized the data. The researchers then combined and examined the dataset and coded the data thematically to determine the preliminary themes. We then invited two more researchers to discuss the preliminary themes, and we reorganized and redefined the themes together. We compared and explored every part of the data with all other parts of the data for variations, similarities and differences. Finally, all data coding,

subthemes, and themes were shown to be consistent among the four researchers at the end of the analysis (three meetings).

The following strategies were used to achieve study rigor. We enriched our dataset by writing memos on the verbatim transcriptions to trace participants' ideas, contexts, meanings, and actions. Participants were asked to feedback on our analyses to verify the accuracy of our interpretations. The credibility of the analysis was confirmed by searching for rival explanations, peer debriefings, and member-checking strategies.

## Results

### Participant characteristics

We recruited 16 health care providers, including 8 nurses, 3 surgeons, 2 gynecologists, 1 Chinese medicine doctor, 1 psychology consultant, and 1 social worker. The mean age of the participants was 40.69 (SD=8.01; range: 32–56) years. Most participants were women (n=13, 81%); 19% (n=3) were men. The mean number of work years in the hospital was 13.5 (SD=7.4; range: 5–30) years. Table 1 provides the background characteristics of the participants. Each participant was measured in his or her degree of willingness to assist patients with fertility preservation before treatment or during pregnancy after treatment on a percentage scale. The degree of willingness was 82.5% (SD=18.9%, range: 50%–100%) for fertility preservation and 82.8% (SD=16.7%, range: 50%–100%) in pregnancy. For the degree of knowledge regarding oncofertility, five participants mentioned they only had a little understanding of oncofertility.

### Personal perspective toward oncofertility

During diagnosis and treatment, respondents observed physical and psychological changes among the patients with breast cancer. Through interaction with the patients, their experiences regarding reproductive care were influenced by the women's physical and psychological status. The health care providers' experience of the six subthemes (explained below) formed a barrier to the discussion of fertility (Table 2). Heightened experience of one aspect in a previous oncological care situation could exacerbate or promote that aspect in another oncofertility care situation.

*Empathizing with the patient's suffering during their diagnosis and treatment.* All participants mentioned their observations about the physical and psychological responses among their patients of childbearing age with breast cancer. When these women were diagnosed with cancer, they initially experienced emotional distress. During the process of cancer treatment, the patient had to face many discomforts. After treatment, they were afraid of cancer recurrence. Health care providers sympathized with the

**Table 1.** Characteristics of the participants (N=16).

Variable	n (%)	Willingness regarding fertility preservation, mean (SD)
Age (years)		
30–39	8 (50)	81.88 (17.72)
40–56	8 (50)	83.13 (21.20)
Sex		
Male	3 (18.8)	91.7 (7.64)
Female	13 (81.3)	80.4 (20.26)
Educational level		
College/university	7 (43.8)	77.86 (15.77)
Postgraduate	9 (56.3)	86.11 (21.18)
Marriage status		
Single	5 (31.3)	80.00 (21.21)
Married	11 (68.8)	83.64 (18.72)
Children		
Yes	9 (56.3)	86.67 (16.77)
No	7 (43.8)	77.14 (21.38)
Employment (years)		
5–9	7 (43.8)	70.71 (21.69)
≥ 10	9 (56.3)	91.67 (10.00)

women who suffered. Some health care providers had negative feelings about their patients' experiences and mentioned that discussing fertility issues with patients made them feel uncomfortable. They believed that fertility issues would increase the patients' suffering:

B: If my patient is unmarried, the disease and treatment may affect her relationship between her and her partner. She may feel anxiety and draw a blank for her future. It is tricky to ask about wanting children. If it were I facing the (fertility) problem, I would feel more pain and overwhelmed.

A: They (patients) are all suffering. I think discussing the issue of infertility with those patients may aggravate their suffering. I will choose to discuss the problem of infertility passively. I will answer or give a response only when asked.

**Safety as a prerequisite.** Fifteen respondents (94%) believed that the patient's life should be considered as the priority regardless of fertility preservation before treatment and becoming pregnant during or after treatment. Some health care providers worry that cancer or previous treatment would affect the patients' health in the future. Some of them also questioned the safety of fertility preservation:

E: If she has to accept drug (hormone) treatment, I usually tend to ask her to stop any birth plan. After getting the disease into a stable state, let's consider pregnancy or other fertility issues. I think the most important thing is surviving.

**Satisfying women's needs.** Most of the participants (94%) stated that women of childbearing age with cancer, especially those who are young, have not yet married, or have

not yet had children, would have more fertility concerns. If patients took the initiative to raise the issue of wanting children in the future, health care providers should cater to their needs as much as possible. These needs may include nutrition, Chinese medicine, or other adjuvant therapies:

D: When the patients are diagnosed, some doctors will take the initiative and ask the patient if they are married or unmarried. Did they have children? He would take the initiative to refer her to doctors at the department of obstetrics and gynecology. If she asked what kind of food is helpful to get pregnant, they may refer her to a nutrition consultant.

**Respecting women's choices.** Some patients with later-stage breast cancer still had the desire to become pregnant after informed explanation. They hope to take ovarian protectors or harvest eggs in advance and keep them for the future. Twelve participants (75%) mentioned that they must respect patient's choices regardless of their decisions:

B: Some (women) are really older. Their treatment time may be too long to get pregnant after treatment. They want to give up the best time for treatment. If they want to store eggs or become pregnant, I think it should be respected.

**Questioning women's ability to raise children.** Seven respondents (44%) mentioned that women needed to take care of themselves before and after treatment. If women wanted to have children, they needed to have enough physical strength and energy to raise them. Some participants also worried about patients' balance of living, such as the cost of fertility preservation. Some health care providers thought that women had a very hard time taking care of themselves. Whether or not they would enough strength and ability to raise their children was questioned:

C: When you discover that you have this disease, you still need to take care of yourself. I will tell her (patient) not to force herself again. Even if the patient tells me that she is eager to have children, and even if she says that she can freeze eggs, I might ask her if she has enough energy to care for her children. Do you really believe their children will receive good care?

**Returning to family life.** As cancer treatment progresses, the survival time of women of childbearing age with breast cancer is improving. Five respondents (31%) expressed that these women, whether married or not, should be able to return to family life at the end of treatment. A child was considered an integral part of a family. Some participants mentioned that having children was also a basic element of marriage:

A: We should not only focus on the treatment of this disease. It is because she (patient) has returned to a normal life after cancer treatment. Maybe she will get married after several years. Some traditional families pay attention to inheritance.

**Table 2.** Interview results from study participants (N = 16).

Themes	Subthemes	Number of participants
Personal perspectives	Empathizing with the patient's suffering during their diagnosis and treatment	16
	Safety as a prerequisite	15
	Satisfying women's needs	15
	Respecting women's choices	12
	Questioning women's ability to raise children	7
	Returning to family life.	5
Barriers	Poor communication among the multidisciplinary team	16
	Lack of initial screening	12
	Insufficient support in women's families	12
	Considerations for a necessary treatment protocol	8
	Lack of information regarding oncofertility	4
	Non-follow-up protocol	4

Therefore, the current medical staff may be more concerned with the issue of childbirth for young patients.

### *Oncofertility barriers*

During the diagnosis of cancer and treatment, medical staff described that they faced many difficulties when assisting women with breast cancer to access fertility care. They mentioned that the interaction process between the medical staff and patients was affected by the medical environment. The difficulties stemming from the six subthemes formed what health care providers viewed as barriers to fertility-related discussion with patients (Table 2). Different subthemes are explained as below.

*Poor communication among the multidisciplinary team.* All interviewees agreed that the need for oncofertility required the participation of many interprofessional medical personnel. When a cancer diagnosis is made, most physicians will inform young patients about the risks of infertility. The patient must decide for or against fertility preservation having been given only a shallow and hasty explanation. Some physicians make referrals to gynecologists. However, most of them were unsure who might be the best person to provide consultation on oncofertility care. Information about parenting-related nutrition, Chinese medicine or other complementary therapies was also unclear:

J: If you have a patient diagnosed with breast cancer now, for example, she comes here on Thursday. Then she wants to consult the gynecologists and therefore cannot accept cancer treatment at the same time. She may have waited two weeks to meet a reproductive expert and is under a lot of stress. Then we are also very troubled. It is important to know if there are other experts we can choose.

*Lack of initial screening.* A total of 12 respondents (75%) said that there was uncertainty about who should explore fertility plans during the initial assessment of the patient. The nursing staff believed that the interpretation of the

disease and its treatment was the doctors' responsibility while the doctors expected the nurses to ask about the women's fertility intentions. Doctors mentioned that the nursing staff were the first line of contact with patients and that the nurses should be able and willing to assess the women's fertility intentions:

D: Explaining the illness is always the responsibility of the attending doctor. I believe that the doctor may have his concerns for not asking the patient (s' idea). If I ask the patient. I worry that the doctor would not be happy. The patient may also be more anxious.

*Insufficient support in women's families.* Twelve respondents (75%) mentioned that oncofertility issues were complex. The patient's decisions on fertility may be affected by family support. The decisions on fertility preservation by unmarried women may be influenced by their mothers, and the decision of pregnancy among married women may be affected by their partners and the partners' families. In addition, fertility preservation is self-financed in Taiwan (not covered by health insurance). Not everyone can afford these costs. Patient-related support groups and resources are the keys to continuing to provide reproductive care, according to health care providers:

F: I think the budget is an issue. All patients transferred from Hexin Hospital would choose to freeze eggs. This is because they're better off financially. I know a young patient transferred from Hexin Hospital who has no work or money, but everyone knows her family would support her. You know, this is a noble hospital. As I know, about 30% of people in our hospital can't freeze eggs because they think the cost is too high.

*Considerations for a necessary treatment protocol.* Half of the respondents described the duration of treatment for some women with breast cancer as long or never-ending, especially for women in a later stage. The longest treatment duration was with hormone therapy. During hormone

therapy, most women of childbearing age would enter early menopause. Some women were diagnosed in childbearing age but become too old to have a realistic chance of conception by the time of treatment completion:

A: Some people need to accept 10 years of hormonal treatment. If she gets sick (cancer) at the age of 40, she may be 50 when she is completely treated. She will already be an elderly mother. That way she would spend the money to freeze her eggs. I would really think it is ineffective. If you tell her about infertility, she may stop treatment.

**Lack of evidence-based information regarding oncofertility.** A quarter of respondents (25%) mentioned that reproductive care in patients with cancer was complicated. The probability of infertility is uncertain, and there is no clear guarantee of the therapeutic effectiveness of reproductive drugs in cancer. Not all health care professionals know the relevant information. Some participants were worried they were not knowledgeable enough to teach patients, and the provision of wrong information would increase patients' anxiety. Only verbal instructions were provided clinically. It was questionable whether patients fully understood the reproductive protection options and risks:

J: This empirical data (of oncofertility) is all over there. However, it is too difficult for patients to understand the contents. If you speak only once, they will not remember it. They need a concise textbook to read again and again. Oncofertility needs more human and material resources.

**Non-follow-up protocol.** When women asked about future fertility counseling and treatment before starting cancer treatment, four health care providers (25%) mentioned that they helped to refer them to gynecologists. However, the health care providers would either not know the patients' decision after referral, or only be passively informed of the patients' selected reproductive protection plan. If the patient does not inform health care providers directly, the treatment plan for breast cancer would be arranged, which could delay the childbearing plan:

D: We have a dedicated nurse at the counter, but she would not know what the patients said or what happened if she was not in the consultation room together. So it is difficult to intervene for the nurses. I am a nurse with the outpatient department. We are not always here. This is the gap I'm talking about. If patients don't tell me the result of referring gynecologist directly, I can't know what happened with the consultation. We have too many patients. Not to mention reminding physicians.

## Discussion

This qualitative research explored the holistic experience of implementing oncofertility care among health care professionals who care for women with breast cancer. The

findings delineating the process surrounding oncofertility care before, during, and after cancer treatment contribute to a comprehensive understanding of the possible issues for the oncofertility team in the real world, and have numerous implications for cancer care in Taiwan. The experiences of provision of advice concerning oncofertility care for reproductive-age patients with breast cancer in health care providers were divided into two themes: personal perspectives and barriers. The data indicate the depth and breadth of the multidisciplinary care and describe complicated issues involving psychological, cultural, institutional, and social dimensions. Our findings are similar to those described in a meta-synthesis reported by Panagiotopoulou et al.<sup>20</sup> They described the barriers and facilitators of fertility preservation care for cancer patients and grouped them as intrinsic and extrinsic. Our findings highlight the dilemma of health care workers' struggle to provide oncofertility care.

We found that health care providers began trying to assess oncofertility needs before initiation of cancer therapy, when the possibility of future pregnancy was discussed. Information about age, marital status, cancer stage, and cancer treatment was proactively collected by our participants. They then weighed up the action of providing or not providing oncofertility counseling and referral based on their personal perspective. Of the six subthemes of personal perspective, satisfying women's needs, respecting women's choices, and returning to family life were the three positive views of why they wished to help women to access oncofertility care. Empathizing the suffering during the diagnosis and treatment, safety as a prerequisite, and questioning women's ability to raise children were the negative subthemes deterring health care providers from providing active oncofertility care. The process of positive-negative views is like a "seesaw." If a health care provider's personal perspectives have more positive views than negative, with perceived low risk and high benefit related to cancer and pregnancy, respectively, then he or she would lean toward discussion of oncofertility as soon as possible.

Previous studies have described the concerns of health care providers such as concern about a poor prognosis,<sup>14,16,21</sup> discomfort in asking women to stop endocrine therapy,<sup>17</sup> and safety during pregnancy and childbirth.<sup>21-23</sup> In our study, these factors corresponded with the view of safety as a prerequisite. In addition, we identified five subthemes that have not been described in previous studies, which would result in health care providers feeling either motivated or reluctant to provide oncofertility care. Subthemes such as empathizing with patients' suffering and questioning her ability to raise children are deeply rooted in the Chinese cultural belief that a parent's role is to raise children as well as possible. Health care providers in Taiwan worried that women with breast cancer would have insufficient physical energy for child-bearing and

child-raising. Women with breast cancer themselves also tend to lack confidence in being able to become pregnant and raise children.<sup>24</sup> This implies that oncofertility practice for women with breast cancer should include strategies to minimize physical energy depletion.

However, subthemes such as satisfying women's needs and respecting women's choices were consistent with patients' expectations,<sup>25,26</sup> and therefore would motivate health care providers to proactively provide oncofertility care. Based on our interview results (with health care providers) as well as previous studies on cancer survivors,<sup>24-26</sup> we found both health care providers and patients were affected by the culture associated with childbearing. Therefore, in addition to encouraging positive personal perspectives in health care providers, creation of a shared decision-making program/platform may also be a good strategy to improve reproductive health in patients with breast cancer.<sup>27</sup>

In our study, six subthemes, including poor communication, lack of initial fertility screening, insufficient support in the patients' families, considerations for necessary treatment protocol, lack of information regarding oncofertility, and non-follow-up protocol, were the barriers to implementing oncofertility care. All of the barriers to oncofertility care have been mentioned in previous studies, including lack of training and education in fertility preservation,<sup>7,14,19</sup> outside the scope of their practice,<sup>13,28</sup> lack of time,<sup>14</sup> poor communication skill or gap between physician and nurses,<sup>18</sup> available resources and institutional characteristics,<sup>18,20</sup> and discomfort with recommending women to stop necessary cancer treatment.<sup>17</sup> Potential solutions could include provision of a list of appropriate referral sources, fact sheets, information booklets, a fertility consultation checklist, and online resources.<sup>21</sup> Clarification of the role of each health professional in the oncofertility team and creation of a standardized risk communication protocol that would include information and guidelines for practice would also be beneficial for young women with breast cancer.<sup>15</sup> In addition, giving young women time to express their concerns about becoming pregnant and possible cancer recurrence would help to build a trusting relationship and create a good opportunity to follow-up decision-making for women desiring pregnancy,<sup>29</sup> especially for childless women. When the desire to conceive is being considered, health care providers should provide education and information concerning adoption when pregnancy is impossible.<sup>30</sup> More research must be conducted in this area.

We included participants who had worked in the hospital for 5–30 years before study enrollment to address the experience of fertility care. The advantage of this experience is that the health care providers have had the time to integrate their experiences and could explain their thoughts clearly and consistently. However, the health care providers' recall of events may be biased. The limited sample

size and the fact that our study participants were mostly women could limit the generalizability of the results to the population as a whole. The percentile score of willingness regarding fertility preservation was higher in male health care professionals with children, who had worked for a long time and had a high level of education in this qualitative study (Table 1). A study with a larger sample size is now needed to confirm our hypotheses.

## Conclusion

Personal perspectives and barriers in women's families and medical environment play key roles among health care providers in their decisions and actions on whether to pursue oncofertility for women. Educating health care providers to have better judgment regarding whether to provide oncofertility care could support them in feeling confident that they were providing accurate pre- or post-treatment pregnancy information. Communication about the role of oncofertility is the first step in the process of fertility preservation, which can alleviate health care staff's distress and enable coping. To provide appropriate and timely intervention, we have suggested an instrument to develop and assess the dilemma of oncofertility among oncofertility team workers. All professionals should develop and discuss integrative strategies to overcome barriers together. Group cooperation can reduce regrets that are ignored or repeated in oncofertility care. Education, strategies, and tactics to overcome the possible negative personal perspectives and barrier difficulties of health care providers in providing optimal fertility care in women with cancer should be implemented in the future. Development of an assessment tool to measure oncofertility barriers among multidisciplinary health care providers might be the first step to overcome the challenges of oncofertility care.

## Author contribution(s)

**Sheng-Miauh Huang:** Conceptualization; Project administration; Writing – original draft.

**Teh-Sing Kao:** Data curation.

**Pei-Ju Lien:** Resources.

**Pei-Ling Hsieh:** Formal analysis.

**Ping-Ho Chen:** Formal analysis.

**Ling-Ming Tseng:** Resources.

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### Ethical considerations

Ethical approval was obtained from the Institutional Review Board of Taipei Veterans General Hospital (2017-01-011AC). All participants voluntarily signed an informed consent form before the interviews were conducted.

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### References

- American Cancer Society. *Breast cancer facts & figures 2019-2020*. Atlanta, GA: American Cancer Society, 2019.
- Ministry of Health Welfare Executive Yuan Taiwan. The mortality of cancer in Taiwan, [https://dep.mohw.gov.tw/DOS/cp-5165-59467-113.html#\\_2.%E7%96%BE%E7%97%85%E7%BD%B9%E6%82%A3](https://dep.mohw.gov.tw/DOS/cp-5165-59467-113.html#_2.%E7%96%BE%E7%97%85%E7%BD%B9%E6%82%A3) (accessed 8 December 2021).
- Bártolo A, Neves M, Carvalho B, et al. Fertility under uncertainty: exploring differences in fertility-related concerns and psychosocial aspects between breast cancer survivors and non-cancer infertile women. *Breast Cancer* 2020; 27(6): 1177–1186.
- Shandley LM, Spencer JB, Fothergill A, et al. Impact of tamoxifen therapy on fertility in breast cancer survivors. *Fertil Steril* 2017; 107(1): 243–252.
- Hartman M, Liu J, Czene K, et al. Birth rates among female cancer survivors: a population-based cohort study in Sweden. *Cancer* 2013; 119(10): 1892–1899.
- Benedict C, Thom BN, Friedman D, et al. Young adult female cancer survivors' unmet information needs and reproductive concerns contribute to decisional conflict regarding posttreatment fertility preservation. *Cancer* 2016; 122(13): 2101–2109.
- Goossens J, Delbaere I, Van Lancker A, et al. Cancer patients' and professional caregivers' needs, preferences and factors associated with receiving and providing fertility-related information: a mixed-methods systematic review. *Int J Nurs Stud* 2014; 51(2): 300–319.
- Hawkins Bressler L, Mersereau JE, Anderson C, et al. Fertility-related experiences after breast cancer diagnosis in the sister and two sister studies. *Cancer* 2019; 125(15): 2675–2683.
- Kim SY, Kim SK, Lee JR, et al. Toward precision medicine for preserving fertility in cancer patients: existing and emerging fertility preservation options for women. *J Gynecol Oncol* 2016; 27(2): e22.
- Gonçalves V and Quinn GP. Review of fertility preservation issues for young women with breast cancer. *Hum Fertil* 2016; 19(3): 152–165.
- Ruggeri M, Pagan E, Bagnardi V, et al. Fertility concerns, preservation strategies and quality of life in young women with breast cancer: baseline results from an ongoing prospective cohort study in selected European centers. *Breast* 2019; 47: 85–92.
- Woodruff TK. Oncofertility: a grand collaboration between reproductive medicine and oncology. *Reproduction* 2015; 150(3): S1–S10.
- Keim-Malpass J, Fitzhugh HS, Smith LP, et al. What is the role of the oncology nurse in fertility preservation counseling and education for young patients. *J Cancer Educ* 2018; 33(6): 1301–1305.
- Krouwel EM, Nicolai MPJ, van Steijn-van Tol AQMJ, et al. Fertility preservation counselling in Dutch oncology practice: are nurses ready to assist physicians. *Eur J Cancer Care* 2017; 26(6): 12614.
- Villarreal-Garza C, Martinez-Cannon BA, Barragan-Carrillo R, et al. Physicians' attitudes, knowledge, and perceived barriers toward fertility preservation in young breast cancer patients in a developing country. *Rev Invest Clin* 2021; 73(6): 347–353.
- Melo C, Fonseca A, Silva C, et al. Portuguese oncologists' practices regarding female fertility preservation: which barriers most relate to these practices. *Eur J Cancer Care* 2018; 27(2): e12812.
- Rosenberg SM, Gelber S, Gelber RD, et al. Oncology physicians' perspectives on practices and barriers to fertility preservation and the feasibility of a prospective study of pregnancy after breast cancer. *J Adolesc Young Adult Oncol* 2017; 6(3): 429–434.
- Mahajan N, Patil M, Kaur S, et al. The role of Indian gynecologists in oncofertility care and counselling. *J Hum Reprod Sci* 2016; 9(3): 179–186.
- Zhang HF, Jiang QH, Huang GY, et al. The educational program for healthcare providers regarding fertility preservation for cancer patients: a systematic review. *J Cancer Educ* 2021; 36(3): 452–462.
- Panagiotopoulou N, Ghuman N, Sandher R, et al. Barriers and facilitators towards fertility preservation care for cancer patients: a meta-synthesis. *Eur J Cancer Care* 2018; 27(1): 12428.
- Ussher JM, Cummings J, Dryden A, et al. Talking about fertility in the context of cancer: health care professional perspectives. *Eur J Cancer Care* 2016; 25(1): 99–111.
- Waks AG and Partridge AH. Fertility preservation in patients with breast cancer: necessity, methods, and safety. *J Natl Compr Canc Netw* 2016; 14(3): 355–363.
- Del Pup L, Peccatori FA, Levi-Setti PE, et al. Risk of cancer after assisted reproduction: a review of the available evidences and guidance to fertility counselors. *Eur Rev Med Pharmacol Sci* 2018; 22(22): 8042–8059.
- Hsieh PL, Huang SM, Chien LY, et al. Risk-benefit perception of pregnancy among breast cancer survivors. *Eur J Cancer Care* 2018; 27(2): e12696.
- Huang SM, Hsieh PL, Hsiung Y, et al. Decision-making process regarding fertility among reproductive-age women with cancer in Taiwan. *Cancer Nurs* 2017; 40(5): 394–402.
- Ussher JM, Parton C and Perz J. Need for information, honesty and respect: patient perspectives on health care professionals communication about cancer and fertility. *Reprod Health* 2018; 15(1): 2.
- Covvey JR, Kamal KM, Gorse EE, et al. Barriers and facilitators to shared decision-making in oncology: a systematic

- review of the literature. *Support Care Cancer* 2019; 27(5): 1613–1637.
28. Benedict C, Thom B and Kelvin JF. Fertility preservation and cancer: challenges for adolescent and young adult patients. *Curr Opin Support Palliat Care* 2016; 10(1): 87–94.
  29. Reinman L, Coons HL, Sopfe J, et al. Psychosexual care of adolescent and young adult (AYA) cancer survivors. *Children* 2021; 8(11): 1058.
  30. Gorman JR, Whitcomb BW, Standridge D, et al. Adoption consideration and concerns among young adult female cancer survivors. *J Cancer Surviv* 2017; 11(1): 149–157.