



Qualitative study of the fertility information support experiences of young breast cancer patients

YuQiao Xiao^a, Jinhua Li^{a,*}, Jing Lei^a, XingFeng Li^a, MeiHua Hu^a, Jiao Zhao^a, Lu Han^a,
OuYin Chen^b

^a Nursing Department, Hunan Cancer Hospital, Changsha, China

^b College of Nursing, Hunan University of Chinese Medicine, Changsha, China

ARTICLE INFO

Keywords:

Information support
Procreate
Qualitative study
Young breast cancer

ABSTRACT

Purpose: This qualitative study aimed to deeply understand the current experience of fertility information support for young breast cancer patients and to provide further evidence supporting the development of a fertility information support project.

Methods: Using purposive sampling, 18 young breast cancer patients were selected for in-depth interviews from June to September 2022. Colaizzi's seven step analysis method and NVivo software were used to analyze and organize the interview data.

Results: Three themes and 10 subthemes were summarized from the interview data: Information anxiety (strong information demand, insufficient information support, information explosion, and information security); reproductive concerns (desire for fertility, anxiety about their children's health, denial of one's health, multiple burdens of emotional interweaving); and family support (the importance of good family relations, the need for a positive marital relationship).

Conclusions: Medical staff should realize the importance of information support for young breast cancer patients and correctly identify the obstacles to insufficient information support. By establishing a fertility information support program, patients' awareness and the quality of fertility information support can be improved to reduce fertility anxiety in breast cancer patients.

1. Introduction

In 2021, the World Health Organization (WHO) declared breast cancer (BC) as the first malignant tumor that seriously threatens the life and health of women worldwide. In China, young breast cancer patients (<40 years old) account for 18.7% of all breast cancer patients (DeSantis et al., 2017; Zhou et al., 2014), compared with 4% in European and American countries. Thus, China has a significantly younger trend in the presentation of this disease. Owing to the mainstream trend of delayed marriages and childbearing in today's society, many patients are childless when diagnosed. With the continuous improvement and optimization of China's fertility policy since 2015, the fertility of young breast cancer patients has gradually attracted widespread attention as a core part of long-term quality of life (Oktay et al., 2018). As radiotherapy and chemotherapy cause irreversible damage to the ovarian function, breast cancer patients only have a 3% chance of pregnancy after treatment, which is 40% lower than that of the general population

(Slepicka et al., 2019). Young breast cancer patients lack reproductive knowledge. As they lack professional post-cancer reproductive information support, patients have different degrees of fertility anxiety, heavy decision-making conflicts and information anxiety, which seriously affects their physical and mental health. A series of studies have been conducted on fertility information support for young breast cancer patients in foreign countries. According to the American Society of Clinical Oncology (ASCO), even if cancer diagnosis is the focus of patients in the early stage of the disease, medical staff should still provide adequate fertility information support to patients in a multidisciplinary manner, and inform them about how to better preserve fertility (Oktay et al., 2018).

Although Chinese researchers have gradually realized the importance of fertility preservation in young breast cancer patients, due to the lack of sufficient information support for cancer and fertility and conservative views regarding fertility preservation technology among some medical staff (Chen and Wu, 2021), addressing the fertility problems of

* Corresponding author. Hunan Cancer Hospital, No. 582, XianJia Lake, YueLu District, ChangSha, 430100, China

E-mail address: 617750325@qq.com (J. Li).

<https://doi.org/10.1016/j.ejon.2023.102275>

Received 23 October 2022; Received in revised form 16 January 2023; Accepted 22 January 2023

Available online 25 January 2023

1462-3889/© 2023 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

young breast cancer patients in China is still in its infancy. Moreover, Chinese studies have predominately used cross-sectional designs to investigate the level of fertility anxiety and its related factors among young breast cancer patients, but have ignored that insufficient provision of fertility information may be a key factor in the high levels of fertility anxiety in patients. Therefore, this qualitative study adopted a descriptive phenomenological approach via in-depth interviews with young breast cancer patients, to deeply understand the current status and obstacles regarding fertility information support for young breast cancer patients in China. The study outcomes may help medical staff better avoid these obstacles by providing high-quality information support for patients. The study also provides evidence by which to support the future development of precise interventions and information support strategies for this group.

2. Method

2.1. Ethical considerations

This study was conducted in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki), and was approved by the Medical Ethics Committee of Hunan Cancer Hospital (KYJJ-2022-068).

2.2. Design

2.2.1. Setting up a research group

The research team had eight members: a chief nurse, a chief physician, three in-charge nurses, and three postgraduates. To ensure correct collection of research data, all team members had received systematic training in qualitative research courses and had knowledge about

fertility issues for young breast cancer patients before the study.

2.2.2. Development of an interview outline

Based on the research team's previous work and the literature review method, the members contacted experts in the breast cancer field for a comprehensive discussion on the research points and formed a preliminary interview outline. A preliminary interview was conducted with four interviewees. The interview outline was based on the preliminary interview results, after the discussion with experts, and consisted of the following questions: Do you have fertility needs? How has the disease affected your fertility needs? How has the illness affected your marriage? How does the disease affect your family relationships? At present, what fertility information support have you obtained? How do you obtain information support? At present, what information do you want to know about marriage life and fertility? Who do you want to provide you with fertility information support? Do you need any other information in terms of fertility information needs?

2.3. Recruitment

In this study, purposive sampling from June to September 2022 was used to select young breast cancer patients from a hospital in Hunan Province. The inclusion criteria were: pathologically confirmed breast cancer; age 19–39 years; normal fertility before the diagnosis of the disease, without any infertility symptoms; clear consciousness, no other mental diseases, and could communicate autonomously; receiving systemic intravenous chemotherapy/endocrine therapy; and provided informed consent and participated voluntarily in the study. The exclusion criteria were patients with other cancers, confusion, language problems, or who had participated in other breast cancer-related studies. This study's sample size was based on the principle of

Table 1

General information of the patients ($n = 18$).

Serial number	Occupation	Age (years)	Education	Marriage status	Number of children (before diagnosis)	Type of health care	Type of surgery
N1	Self-employed	27	Secondary school	Married	Son	New Farmers' Cooperative	Radical resection of the left breast modification
N2	Self-employed	38	None	Married	Son	New Farmers' Cooperative	No surgery
N3	Farmer	36	Secondary school	Married	2 sons	New Farmers' Cooperative	Left breast conservation
N4	Farmer	31	Secondary school	Married	Daughter	New Farmers' Cooperative	Right breast radical resection
N5	Farmer	33	Technical secondary school	Married	Son	New Farmers' Cooperative	Right breast modified radical resection
N6	Farmer	26	Secondary school	Married	2 daughters	New Farmers' Cooperative	Left breast modification radical resection + breast reconstruction
N7	Employee	33	Undergraduate	Married	None	Own expense	Right breast modified radical resection
N8	Nurse	31	Technical secondary school	Divorced	None	New Farmers' Cooperative	No surgery
N9	Nursery staff	35	Secondary school	Married	3 daughters	New Farmers' Cooperative	Right breast modified radical resection
N10	Unemployed	27	College	Married	1 son and 1 daughter	Municipal health insurance	Right breast modified radical resection
N11	Self-employed	37	Secondary school	Married	1 son and 1 daughter	New Farmers' Cooperative	No surgery
N12	Unemployed	28	College	Married	3 daughters	Municipal health insurance	No surgery
N13	Teacher	31	Undergraduate	Married	Daughter	Employee health insurance	Right breast modified radical resection
N14	Farmer	39	Secondary school	Married	Son	Municipal health insurance	Left breast conservation
N15	Nurse	32	Undergraduate	Married	2 daughters	New Farmers' Cooperative	Left breast modification radical resection + breast reconstruction
N16	Self-employed	30	Undergraduate	Married	Son	New Farmers' Cooperative	Right breast modified radical resection
N17	Self-employed	28	Technical secondary school	Unmarried	None	New Farmers' Cooperative	Radical resection of the left breast modification
N18	Unemployed	33	Undergraduate	Unmarried	None	Municipal health insurance	Right breast radical resection

information saturation (Cypress, 2017); that is, sampling was considered complete when no new topics were introduced by the interviewees, and data analysis was repetitive. Eighteen female participants were interviewed. Table 1 presents the sample characteristics.

2.4. Data collection

The interviewers conducted face-to-face semi-structured interviews with the 18 research participants from June to September 2022. Each interview took 40–60 min, and the interviewer consulted the participants' medical records in advance. The interviews were conducted in the department conference room, the conversation room, or the head nurse's office. The participants and researchers had determined the interview location and time the day before. The purpose and content of the study were explained to the research participants before the interview, who then signed the informed consent form before the recording. Silence was maintained during the interviews to ensure that the interviewees were relaxed and comfortable. During the interview, another researcher recorded the interviewees' expressions, hand movements, and other non-verbal expressions in detail, which were verified and corrected by both parties after the interview. The entire interview process was based on the interview outline; the question method and order were flexibly adjusted according to the interviewees' answers, and the turning points of the words or emotional changes repeatedly mentioned by the interviewees were recorded during the questioning process. After the interview, the recording was translated into text within 24 h, and the key points recorded during the interview were marked in the transcript. The next day, the interviewees returned to the interviews for verification. They confirmed any discrepancy immediately to ensure the accuracy and authenticity of the information.

2.5. Data analysis

The interview data were analyzed using Colaizzi's seven step analysis method (Chesser-Smyth, 2005). The researchers transcribed and carefully read the interview transcripts within 24 h after the interviews ended. The transcripts were anonymously filed as N1–N18 and imported into the NVivo11.0 software for analysis. The researchers analyzed significant statements in the interviews, such as repeated words or turning points of emotional change. The two researchers independently coded repeated views in the interview. These coded views were pooled to form six themes and 24 subthemes. A detailed, complete description was written. Similar perspectives were identified and collected for the research group experts to brainstorm through repeated comparative analysis and discussion, thereby extracting three themes and 14 subthemes. These themes were sent back to the interviewees for confirmation, and they were revised again until finally only three themes and 10 sub-themes remained, after excluding sub-themes such as "Anxiety about your spouse" and "Embarrassment".

2.6. Quality control

The research process applied "Triangulation" (Carter et al., 2014), that is, the general information of the respondents was considered fully when sampling, and respondents with different characteristics were selected to ensure differences in the samples. A main interviewer conducted the interviews by asking questions and observing, while another researcher was responsible for supervising whether the interviewer maintained a neutral attitude. After the interview, the researcher pointed out any problems observed; for example, the interviewer should try to take initiative during the interview and always adhere to the interview outline. When the interviewees diverted from the questions, the researcher should guide their thoughts back to the scope of the interview at the right time and then integrate the data recorded by both sides. In the completed transcripts, the interviewer and all researchers confirmed that the text data should include the recording and analysis of

diary reflections that were primarily aimed toward the questions and the interview as the point for reference when in doubt or when assessing data that was not annotated clearly. For example, in one interview, a Changsha native stated that she was "Changsha Li Shou," which translates as independent. After the transcription, another researcher questioned this interviewee and confirmed that the translation of the dialect was correct. In the theme coding process, the interviewee first filed anonymously, conducted the theme coding analysis in form of two-person independent coding, and repeated the analysis process to achieve a virtuous cycle. Finally, the researchers and experts discussed and formed the final codes and themes.

3. Results

Three overarching themes and 10 subthemes were identified: (i) Information anxiety: demand for information, insufficient information support, information explosion, security of information; (ii) Reproductive concerns: craving for fertility, anxiety about the health of their children, denial of one's health, multiple burdens of emotional interweaving; (iii) Family support: the importance of good family relations, the need for a positive marital relationship. Subthemes are described and illustrated below in italics.

3.1. Information anxiety

This theme primarily encompassed the information anxiety of young breast cancer patients, who had strong information needs, but lacked sufficient information support, which meant they were unable to correctly identify the authenticity and validity of information.

3.1.1. Demand for information

The young breast cancer patients had high enthusiasm and initiative to obtain fertility knowledge. However, most patients could not accurately judge the authenticity and accuracy of the information obtained. Therefore, they hoped that medical staff could provide diversified information channels to meet their information needs.

"I think we can push some small articles through the form of official accounts." (N9, 35 years old); "I think we can talk about birth-related information in form of lectures." (N3, 36 years old); "I think the form of small video is also great" (N15, 32 years old)

For patients, the satisfying information needs can greatly alleviate the anxiety and depression caused by the unknown. As the group with the most contact after diagnosis, patients showed trust in and dependence on medical staff. Therefore, when patients' information needs are not paid sufficient attention by medical staff, it is easy to cause patients to have negative emotions towards such staff, resulting in high levels of decision conflict and decision regret.

"Medical staff may think that we should all know that we can't take the pill for this disease (breast cancer), but we don't really know why, I think that information should be made clear to us." (N8, 31 years old); "I think I get less information from doctors than I do from the internet" (N1, 27 years old)

3.1.2. Insufficient information support

In the process of diagnosis and treatment, due to changes in body image caused by surgery, radiotherapy, chemotherapy, endocrine therapy, and so forth, the young breast cancer patients were prone to negative emotions related to low self-esteem and anxiety, which affected the progress of treatment and the patient's physical and mental health. Under the influence of traditional Chinese culture, most patients were restrained and subtle when talking about fertility information suppose, such as with respect to their sex life. Even if there were sexual issues or dysfunction caused by treatment, some patients considered the topic is sensitive, were afraid of being misunderstood, and rarely took the

initiative to mention issues or consult with medical staff.

"I worry that my doctor misunderstands my motives and thinks I'm not cooperating with treatment, and that instead, I am thinking about something else (sexual life)." (N15, 32 years old); "It (sexual life) was so sensitive, I think asking the doctor would put me in an awkward position." (N3, 36 years old)

Insufficient patient information support, inability to meet the current information needs, the inability to understand some professional diagnosis and treatment methods, and difficulty communicating comprehensively with medical staff affected patients' ability to make correct decisions and was not conducive to establishing a good relationship of trust between patients and medical staff.

"What is fertility preservation?" (N3, 36 years old); "The doctor just asked me if I wanted to have a second child and he said if I don't want to have a second child, then I don't talk about it. I was trying to save my life, so I didn't even have that information." (N16, 30 years old); "I regret not coming to such a big hospital for surgery. The local hospital did not give me enough information to make my choice." (N4, 31 years old)

3.1.3. Information explosion

In the era of rapid development information networks, patients can obtain a variety of information through various means. Some network platforms generate clicks (hits) by using attention-capturing titles to attract patients; however, the quality of information may be poor, patients may be unable to distinguish the authenticity of information, which can aggravate the psychological burden of patients. As the amount of information received by patients continues to expand, some patients even begin to avoid information. In addition, some patients are convinced of some erroneous online remarks, which caused varying degrees of distress to patient.

"I saw a headline on Baidu stating that 'you can't have sex after getting cancer', but I clicked on it to see the content was inconsistent with the title." (N9, 35 years old); "When I get sick, I don't want to check the relevant information or listen to other people to avoid psychological burden." (N15, 32 years old); "They say couples can't have sex with breast cancer, although we do not know the truth, we didn't dare try" (N12, 28 years old)

3.1.4. Security of information

For patients, the information support provided by the hospital was professional and authoritative. Patients were more convinced by the information support provided by the medical staff. Patients desired a sense of information security from professionals and professional platforms, and expressed their affirmation and trust in the information support provided by the whole course management information platform developed by our hospital.

"I would prefer medical staff to provide us with this information." (N9, 35 years old); "The whole course management (platform) is great, and now I basically ask the case manager or doctor about what I want to know on that platform." (N10, 27 years old); "I can download the whole course management platform. I usually ask questions on that platform and they (medical staff) will carefully guide me." (N13, 31 years old)

3.2. Reproductive concerns

The second theme addressed the complex emotions experienced by young breast cancer patients with fertility issues. They wanted to have children but were worried that treatment would endanger their child's health. At the same time, they denied their own health status, and the heavy psychological burden made them unable to face the fertility problem appropriately.

3.2.1. Craving for fertility

Most of the young breast cancer patients aspired to have a complete family and believed that children are an important hub to maintain the family. In addition, some patients were more eager to have children due to major family changes. Therefore, patients expected medical staff to listen to their true needs before providing them with a diagnosis and treatment plan, and not to make subjective judgments about their fertility needs based on their fertility situation.

"Because I think having a baby makes me whole." (N14, 39 years old); "My previous child died of illness, and my current husband doesn't have any children yet. He really wants a child." (N8, 31 years old); "They (medical staff) didn't give me that information either, probably thinking I'd already had three children." (N12, 28 years old)

In addition, in the early stage of diagnosis and treatment, given the fear of cancer and death, most of the young breast cancer patients ignored the importance of fertility preservation. However, as their condition improved after diagnosis and treatment, patients, especially unmarried patients, still desired to have children.

"Because people always change, I don't want to give birth now, maybe I want to give birth in a few years?" (N18, 33 years old)

3.2.2. Anxiety about the health of their children

After the diagnosis, the patients' anxiety about their children was expressed from two different aspects. From one perspective, patients regarded their children as the driving force for survival and were eager to witness their children grow. From another perspective, patients, especially unmarried women, were afraid of the hereditary nature of cancer and worried about the health of their children, which affected their fertility decisions.

"I feel like children are my spiritual pillar." (N6, 26 years old); "I actively receive treatment because I want more time with my baby" (N15, 32 years old); "I'm not going to have kids because I don't want to encumber them." (N17, 28 years old)

In addition, many patients said that the particularities of breast cancer drug treatment and the health status of existing children also caused them to worry about fertility.

"I still wanted to have a baby, but I was worried about the health effects of these chemotherapies." (N1, 27 years old); "I already have an unhealthy child, so now I just want a healthy child." (N8, 31 years old)

3.2.3. Denial of one's health

When the patients faced survival and fertility problems, the threat of cancer recurrence became a major factor hindering their fertility. Owing to the long cycle of anti-cancer treatment, the ages of the patients and their spouses also become the main factors hindering the patients' fertility.

"I worry that having a baby will drag me down even more." (N16, 30 years old); "My husband is in his 50s. By the time I can have a baby, he will be in his late 60s, How can I have one?" (N14, 39 years old)

In addition, the patients also said that their physical condition was an important factor that affected their and their families' attitudes towards fertility. The young breast cancer patients exhibited a higher level of anxiety when facing fertility-related problems than do normal women of the same age.

"I feel like I might experience more pain if I get pregnant than someone else." (N11, 37 years old); "My family and I were thinking about having a daughter, but now we are worried that my body will not be able to handle it." (N5, 33 years old)

3.2.4. Multiple burdens of emotional interweaving

After diagnosis of the disease, most patients had a variety of negative emotions, and in severe cases, avoidance of social situations occurred. Patients feared discrimination and desired to be seen as “normal” or to return to a “normal state. As a result, many patients said they found similarities in patients in the same department, which made them feel more relaxed.

“I usually go out at night because I’m afraid to meet other people.” (N4, 31 years old); “I hope people can treat me like a normal person and not a patient.” (N7, 33 years old); “In the hospital I will not wear artificial breast, anyway, everyone is the same.” (N17, 28 years old)

At the same time, after the diagnosis of the disease, most patients expressed the hope to establish a good relationship of trust with medical staff, which not only made patients feel valued and respected, but also relieved their psychological pressure and improved their enthusiasm for treatment.

“My doctor is very responsible. He explains to me in detail every time. I feel I am treated with respect.” (N10, 27 years old); “My doctors and nurses are very responsible and I am happy to cooperate with them in my treatment.” (N6, 26 years old)

3.3. Family support

The final theme described the importance and necessity of good family support for young breast cancer patients, explaining the role of positive family and marital relationships for patients.

3.3.1. The importance of good family relations

Family atmosphere affected patients’ attitudes toward the disease. Patients with a negative family atmosphere bore the disease and economic pressure alone and were more likely to experience loneliness and depression.

“I felt that my mother didn’t care about my emotions at all, she didn’t give me verbal or spiritual support. “ (N4, 31 years old); “My parents-in-law do not like me and are cold to me. I do not want to see them.” (N3, 36 years old)

Some patients were worried about their parents’ old age and health status, and were unwilling to tell their parents the truth. The lack of family support aggravated the bad mood of patients, which was not conducive to the physical and mental health of patients.

“I didn’t tell my parents (sobbing), I was afraid they wouldn’t take it well.” (N9, 35 years old)

On the contrary, patients with good family emotional support said that this support helped them face the disease more calmly, obtain effective moral support, and highly alleviated their anxiety and depression.

“My father-in-law would send me messages to encourage me, and my mother-in-law usually wouldn’t let me do anything. I am very grateful to them.” (N1, 27 years old)

3.3.2. The need for a positive marital relationship

Spouses were the main caregivers for most of the young patients and patients may have symptoms such as reduced libido, vaginal dryness, and painful intercourse because of medication and surgeries (Jing et al., 2019). The fear of fertility loss and negative changes in physical images caused patients to have a strong sense of inferiority to their spouses.

“I felt I would have low self-esteem in front of my husband, so I chose to do a (breast) reconstruction anyway.” (N15, 32 years old)

Patients worried about not being sufficiently attractive to their spouse, and they become sensitive and suspicious when influenced by

negative emotions, which was not conducive to healing from the disease. However, when the patient’s relationship with their spouse was positive, the patient gained courage and confidence in treatment. In addition, a positive marital relationship also encouraged patients to actively obtain information about improving the quality of their sex life and the appropriate timing of childbirth, which was conducive to improving the patients’ quality of life.

“At first I didn’t want to have treatment. My husband has been enlightening me and encouraging me, so I want good treatment and spend more years with him.” (N10, 27 years old); “My husband is very kind to me, and I’d love to have a baby for him. When is it best to have a baby?” (N8, 31 years old)

4. Discussion

The results of our study revealed that young breast cancer patients face greater prognosis and treatment challenges compared with older patients (Radecka and Litwiniuk, 2016). Influenced by the Chinese traditional culture, most young patients still desire giving birth after the disease is diagnosed. However, at this stage, patients pay more attention to their own survival, and because of the lack of information support, it is difficult to consider the impact of fertility impairment on long-term quality of life. Owing to the fear of cancer recurrence and death, patients are prone to self-denial and role maladjustment, which seriously affects their physical and mental health, leading to a higher level of fertility anxiety and decision-making conflict in later stages of the disease (Ehrbar et al., 2019).

Effective fertility information support can help patients to manage their reproductive health, promote their participation in fertility preservation, and reduce their level of fertility anxiety (Benedict et al., 2016). ASCO has also repeatedly emphasized the importance of providing adequate fertility information support for young patients with breast cancer (Oktay et al., 2018). At present, medical staff are gradually paying attention to this special group and conducting some corresponding intervention measures; however, our study found that the quality of fertility counseling and communication is not ideal. Patients often perceive survival and fertility as contradictory, and the fertility needs of young patients are often dynamic.

Additionally, as the results of our study revealed, young breast cancer patients have a strong ability to collect information and high self-awareness, and they have gradually improved their understanding of the integration of medical care in the context of the booming development of the medical industry in China (Karimi-Shahanjarini et al., 2019). In recent years, the multidisciplinary team (MDT) joint collaboration model has been widely used in clinical work to promote communication between different disciplines, form team knowledge sharing, improve the decision-making ability of medical staff, reduce decision-making fatigue, and achieve the role of correcting self-role blurring and the inability to grasp the needs of patients (Blackwood and Deb, 2020). In a randomized controlled study conducted by Ehrbar et al. (2021), an interdisciplinary team provided fertility counseling to young breast cancer patients, which effectively improved their fertility-related knowledge and reduced the level of decision-making conflict. Shah et al. (2019) also noted that multidisciplinary joint management should be conducted for fertility problems in young breast cancer patients to improve their participation rate in fertility preservation and long-term quality of life. China has also made many attempts to apply multidisciplinary models, but owing to the high requirements of the MDT model for medical staff from different disciplines, insufficient communication between disciplines, and insufficient attention of team members, including nursing staff, to their own roles, it is difficult to coordinate and operate efficiently (Lu et al., 2019; Shah et al., 2019).

In addition, with the rapid development of information on medical treatment, the pressure on information platform construction is rising. Information platforms can not only help young breast cancer patients

obtain fertility and cancer-related information, but also greatly improve the knowledge reserve ability of patients and the enthusiasm for fertility preservation (Huang et al., 2022). In our study, patients also affirmed the entire course on the disease-management information platform established by our hospital multiple times. This platform, centered on the case managers in our hospital, combines multiple disciplines to provide effective information support and home care for patients. In future research, an information platform should be vigorously developed to provide convenient whole-course services for patients. This study also found that patients had more trust in doctors because of their professionalism. Therefore, it is necessary to improve the professional level of nurses in clinical work, pay attention to their bridging role in the multidisciplinary team, and help them to better assume the role of fertility information support (Peccatori et al., 2013), which is consistent with international guidelines (Oktay et al., 2018).

A good social support system can effectively alleviate patients' negative emotions and physical pain, giving them hope for survival and confidence in treatment. The updated guidelines of the ASCO (Oktay et al., 2018) and the European Society for Medical Oncology (EMSO; Peccatori et al., 2013) state that fertility preservation support for young cancer patients cannot be separated from support between governments and major agencies. In addition, our research found that support from medical staff plays an important role. Under the dual pressure of survival and fertility, patients are eager to establish a good trust relationship with medical staff. However, staff are affected by a large clinical workload in China and most experience associated negative emotions to some extent. Patients are prone to misunderstanding medical staff, such as thinking that medical staff do not have the energy and time to provide information support for them. Further, some clinical workers lack sufficient experience to correctly identify and judge the patients' needs, causing patients to avoid seeking information and feel embarrassed about asking medical staff for relevant information. Therefore, in future studies, medical staff should establish sufficient understanding of young breast cancer patients regarding sexual life and the avoidance of unwanted pregnancy during treatment and provide information support for patients by using small lectures supplemented by major media used by young groups such as Douyin and WeChat.

4.1. Implications of the study

We suggest that in future clinical work, medical staff should pay great attention to the fertility information needs of patients, and avoid subjective judgments of fertility needs according to marital status and the number of children (Dagan et al., 2017). Medical staff should fully respect the rights and interests of patients, and meet their information needs, which would simultaneously help the long-term development of doctor-patient relationships (Speller et al., 2019).

We further recommend that patients should be supported by a wide range of fertility information, and many patients have expressed a desire to be helped by a multidisciplinary team during follow-up. In addition, cooperation with multidisciplinary experts is necessary to build an information management platform, so that patients can obtain professional fertility information support more efficiently.

In addition, throughout the interviews, we found that good emotional support is necessary for patients, and the lack of sufficient emotional support can easily lead to adverse negative emotions in patients, which is not conducive to their physical and mental health. Therefore, in clinical work, medical staff should pay more attention to the level of social support of patients, and help patients to establish an effective support system; that is, encourage patients to participate in social and family activities, and thereby enhance their self-worth.

4.2. Limitations of the study

This study's primary limitation is that the interviews were only conducted in a Class iii Grade A hospital in Hunan Province. A

subsequent study should be conducted to obtain deeper understanding of the current needs and barriers of this group, including their caregivers, and thus improve the evidence by which to support these patients.

5. Conclusions

After diagnosis of the disease, young breast cancer patients are often prone to fear of death, and commonly regard fertility and survival as contradictions in the absence of sufficient fertility information support. Many young patients fail to realize the importance of fertility preservation at the beginning of the disease, which also increases their level of decision-making conflict and decision regret. Therefore, to improve the long-term quality of life of patients, it is necessary for professional medical staff to provide them with high-quality multidisciplinary fertility information support, increase the knowledge reserve of patients' fertility information, improve patients' enthusiasm for fertility preservation, and enhance patients' long-term term worries.

Funding

This work was supported by The Hunan Provincial Health Commission [grant number: 202214054649] and The Hunan Province Graduate Training Innovation Practice Base Project in 2019 [grant number: Xiang Teach Tong 2019-248].

CRedit authorship contribution statement

YuQiao Xiao: Writing – original draft, Writing – review & editing, Formal analysis, Data curation. **Jinhua Li:** Formal analysis, Supervision, Provision of, Resources, Project administration. **Jing Lei:** Conceptualization, Supervision, Formal analysis, Data curation, Validation. **Xing-Feng Li:** Formal analysis, Validation. **MeiHua Hu:** Conceptualization. **Jiao Zhao:** Conceptualization. **Lu Han:** Formal analysis. **OuYin Chen:** Conceptualization, Methodology, All authors read and approved the final manuscript.

Declaration of competing interest

None declared.

Acknowledgements

The authors are grateful to the patients who were willing to participate in this study and to all the health care professionals and researchers who helped with this study.

References

- Benedict, C., Thom, B., N Friedman, D., Diotallevi, D., M Pottenger, E., J Raghunathan, N., Kelvin, J.F., 2016. Young adult female cancer survivors' unmet information needs and reproductive concerns contribute to decisional conflict regarding posttreatment fertility preservation. *Cancer* 122, 2101–2109. <https://doi.org/10.1002/cncr.29917>.
- Blackwood, O., Deb, R., 2020. Multidisciplinary team approach in breast cancer care: benefits and challenges. *Indian J. Pathol. Microbiol.* 63, S105–S112. https://doi.org/10.4103/IJPM.IJPM.885_19.
- Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., Neville, A.J., 2014. The use of triangulation in qualitative research. *Oncol. Nurs. Forum* 41, 545–547. <https://doi.org/10.1188/14.ONF.545-547>.
- Chen, Y., Wu, K., 2021. Status and clinical response of fertility preservation in young patients with breast cancer. *Zhonghua wai ke za zhi [Chinese journal of Surgery]* 59, 104–108. <https://doi.org/10.3760/cma.j.cn112139-20201013-00750>.
- Chesser-Smyth, P.A., 2005. The lived experiences of general student nurses on their first clinical placement: a phenomenological study. *Nurse Educ. Pract.* 5, 320–327. <https://doi.org/10.1016/j.nepr.2005.04.001>.
- Cypress, B.S., 2017. Rigor or reliability and validity in qualitative Research: perspectives, strategies, reconceptualization, and recommendations. *Dimens. Crit. Care Nurs.* 36, 253–263. <https://doi.org/10.1097/DCC.0000000000000253>.

- Dagan, E., Modiano-Gattegno, S., Birenbaum-Carmeli, D., 2017. 'My choice': breast cancer patients recollect doctors fertility preservation recommendations. *Support. Care Cancer* 25, 2421–2428. <https://doi.org/10.1007/s00520-017-3648-1>.
- DeSantis, C.E., Ma, J., Goding Sauer, A., Newman, L.A., Jemal, A., 2017. Breast cancer statistics, 2017, racial disparity in mortality by state. *CA A Cancer J. Clin.* 67, 439–448. <https://doi.org/10.3322/caac.21412>.
- Ehrbar, V., Urech, C., Rochlitz, C., Zanetti Dällenbach, R., Moffat, R., Stiller, R., Germeyer, A., Nawroth, F., Dangel, A., Findeklee, S., Tschudin, S., 2019. Randomized controlled trial on the effect of an online decision aid for young female cancer patients regarding fertility preservation. *Hum. Reprod.* 34, 1726–1734. <https://doi.org/10.1093/humrep/dez136>.
- Ehrbar, V., Germeyer, A., Nawroth, F., Dangel, A., Findeklee, S., Urech, C., Rochlitz, C., Stiller, R., Tschudin, S., 2021. Long-term effectiveness of an online decision aid for female cancer patients regarding fertility preservation: knowledge, attitude, and decisional regret. *Acta Obstet. Gynecol. Scand.* 100, 1132–1139. <https://doi.org/10.1111/aogs.14108>.
- Huang, S.M., Tseng, L.M., Yang, M.J., Chang, A., Lien, P.J., Hsiung, Y., 2022. Developing a web-based oncofertility tool for reproductive-age women with breast cancer based on social support framework. *Support. Care Cancer* 30, 6195–6204. <https://doi.org/10.1007/s00520-022-07046-x>.
- Jing, L., Zhang, C., Li, W., Jin, F., Wang, A., 2019. Incidence and severity of sexual dysfunction among women with breast cancer: a meta-analysis based on female sexual function index. *Support. Care Cancer* 27, 1171–1180. <https://doi.org/10.1007/s00520-019-04667-7>.
- Karimi-Shahanjarini, A., Shakibazadeh, E., Rashidian, A., Hajimiri, K., Glenton, C., Noyes, J., Lewin, S., Laurant, M., Colvin, C.J., 2019. Barriers and facilitators to the implementation of doctor-nurse substitution strategies in primary care: a qualitative evidence synthesis. *Cochrane Database Syst. Rev.* 4, CD010412 <https://doi.org/10.1002/14651858.CD010412.pub2>.
- Lu, J., Jiang, Y., Qian, M., Lv, L., Ying, X., 2019. The improved effects of a multidisciplinary team on the survival of breast cancer patients: experiences from China. *Int. J. Environ. Res.* 17, 277. <https://doi.org/10.3390/ijerph17010277>.
- Okta, K., Harvey, B.E., Partridge, A.H., Quinn, G.P., Reinecke, J., Taylor, H.S., Wallace, W.H., Wang, E.T., Loren, A.W., 2018. Fertility preservation in patients with cancer: ASCO clinical Practice guideline update. *J. Clin. Oncol.* 36, 1994–2001. <https://doi.org/10.1200/JCO.2018.78.1914>.
- Peccatori, F.A., Azim Jr., H.A., Orecchia, R., Hoekstra, H.J., Pavlidis, N., Kesic, V., Pentheroudakis, G., ESMO Guidelines Working Group, 2013. Cancer, pregnancy and fertility: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. *Ann. Oncol.* 24, vi160–vi170. <https://doi.org/10.1093/annonc/mdt199>.
- Radecka, B., Litwiniuk, M., 2016. Breast cancer in young women. *Ginekol. Pol.* 87, 659–663. <https://doi.org/10.5603/GP.2016.0062>.
- Shah, N.M., Scott, D.M., Kandagatla, P., Moravek, M.B., Cobain, E.F., Burness, M.L., Jeruss, J.S., 2019. Young women with breast cancer: fertility preservation options and management of pregnancy-associated breast cancer. *Ann. Surg. Oncol.* 26, 1214–1224. <https://doi.org/10.1245/s10434-019-07156-7>.
- Slepicka, P.F., Cyrill, S.L., Dos Santos, C.O., 2019. Pregnancy and breast cancer: pathways to understand risk and prevention. *Trends Mol. Med.* 25, 866–881. <https://doi.org/10.1016/j.molmed.2019.06.003>.
- Speller, B., Metcalfe, K., Kennedy, E.D., Facey, M., Greenblatt, E., Scheer, A.S., Warner, E., Joy, A.A., Wright, F.C., Baxter, N.N., 2019. The “Begin Exploring Fertility Options, Risks and Expectations” (BEFORE) decision aid: development and alpha testing of a fertility tool for premenopausal breast cancer patients. *BMC Med. Inf. Decis. Making* 19, 203. <https://doi.org/10.1186/s12911-019-0912-y>.
- Zhou, C., He, J.j., Li, J., Fan, J.h., Zhang, B., Yang, H.j., Xie, X.m., Tang, Z.h., Li, H., Li, J. y., Wang, S.l., Qiao, Y.l., Huang, R., Zhang, P., 2014. A nation-wide multicenter 10-year (1999–2008) retrospective clinical study of endocrine therapy for Chinese females with breast cancer. *PLoS One* 9, e100159. <https://doi.org/10.1371/journal.pone.0100159>.