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ORIGINAL RESEARCH

A Qualitative Study of Fertility Preservation Experience in Women with Breast Cancer

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Objective: To explore the experiences of women with breast cancer who have undergone fertility preservation and to explore the psychological needs of patients.

Methods: Using descriptive phenomenological research methods, 11 patients who underwent oocyte or embryo cryopreservation after diagnosis of breast cancer were selected for semi-structured interviews in a tertiary care hospital. Themes were distilled using Colaizzi's 7-step analysis and reported according to COREQ guidelines.

Results: The experiences of women with breast cancer who underwent fertility preservation can be categorized into 4 themes and 11 sub-themes: a. Physical pain and discomfort (physiological pain, tolerance of physical discomfort); b. heavy psychological burdens (fertility worries, self-blame and guilt, loneliness and helplessness, bias from others and self); c. Actively seeking and benefiting from ways of coping with illness (life over procreation; hope, confidence and courage; positive coping with illness; adequate social support; growth follow in adversity); d. Lack of fertility-related information support.

Conclusion: Oncology and reproductive health professionals should pay attention to the experiences of breast cancer patients undergoing fertility preservation and target timely, scientific, and effective interventions to promote disease recovery and improve quality of life.

Keywords: breast cancer, tumor, fertility preservation, assisted reproductive technology, qualitative research

Introduction

Breast cancer represents the most common form of malignant tumor in women of childbearing age. In China, there is an incidence of approximately 357,000 new cases of breast cancer on an annual basis, constituting 7.4% of all cancer cases. Survey data demonstrate that up to 40% of women of reproductive age who have survived breast cancer express a desire to have children.[1–4]

It is important to note that both the disease itself and the anti-cancer treatment can have a detrimental effect on a woman's fertility. Chemotherapy and radiotherapy have been shown to have a direct impact on gonadal function, and the reproductive age that is delayed as a consequence of the fight against cancer is accompanied by a natural decline in ovarian function.[5,6] The advent of fertility preservation techniques, including oocyte and embryo cryopreservation, has enabled women of childbearing age diagnosed with breast cancer to realize their fertility aspirations.[7,8] However, women diagnosed with breast cancer who are undergoing fertility preservation treatment face the dual stress of undergoing antitumor therapy for breast cancer and the implementation of fertility preservation techniques. In addition to the physical discomfort associated with ovarian stimulation and oocyte retrieval surgery, and the emotional distress caused by endocrine hormone changes, there is also the risk of cancerous cells spreading due to delays in oncological treatments, and the potential for breast cancer to recur as a consequence of pregnancy.[9] An in-depth understanding of the experiences and needs of women with breast cancer of reproductive age during treatment is necessary to ensure successful implementation of fertility preservation therapy.[10]

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At present, qualitative research into the experiences of women with breast cancer undergoing fertility preservation treatment is limited to the need for fertility preservation decision-making.[11,12] Women's experiences of fertility preservation influenced by socio-cultural differences.[13] Therefore, this study adopted the descriptive phenomenological research method in qualitative research to interview breast cancer fertility preservation patients, with the aim of gaining an in-depth understanding of the physical and psychological experiences of women with breast cancer during fertility preservation treatment in the context of Chinese culture, and to provide a reference base for clinical health care to develop targeted intervention strategies.

Methods

Study Design

The study was guided by descriptive phenomenological research methods in qualitative research, using face-to-face semi-structured interviews to collect data, and reporting according to COREQ guidelines.[14] Descriptive phenomenology is centered on the idea of "returning to the thing itself", and emphasizes the pure experience or "primitive intuition" of the individual in relation to phenomena. It advocates the release of the individual from traditional concepts, theories, prejudices and customary ways of thinking, and the recognition of things from the pure phenomena that are initially perceived, with the ultimate objective being the realization and grasp of the essence of facts and their meanings.[15] The two interviewers had learned and mastered the content and interviewing techniques of qualitative research. The first author, the primary interviewer, has been working in reproductive health for over ten years and is a clinically experienced co-chief superintendent nurse. The other interviewer was a postgraduate nursing student who assisted with the transcription and analysis of the interviews. The interviewers were all women with no experience of fertility preservation or breast cancer to minimize personal bias; the interviewer was involved in the daily care of the interviewees and developed a full relationship of trust with the interviewees.

Ethics Approval

This study strictly followed the Declaration of Helsinki and was approved by the Medical Ethics Committee of Sir Run Run Shaw Hospital, Zhejiang University School of Medicine (Approval ID: 2024-0572). All participants gave informed consent and volunteered to participate in this study. Personal information was anonymized and only members of the research team had access to the audio recordings and transcripts. Participants could withdraw at any time during the study with no consequences.

Participants

A purposive sampling method was used to select women with breast cancer who underwent fertility preservation from July 2024 to October 2024 at the Reproductive Centre of a tertiary-level hospital in Hangzhou city as the study population. Data were obtained from the hospital's electronic medical record system, and patients who underwent fertility preservation after diagnosis of breast cancer were selected by the researcher. Multidimensional sampling was conducted to exclude external factors from biasing the results, and participants with different ages, education levels, marital status, and different fertility preservation methods were purposely approached. The purpose and significance of the study were explained to them and face-to-face interviews were conducted after obtaining informed consent.

Inclusion Criteria

a. Women aged 18 to 42;
b. Patients with breast cancer confirmed by pathological examination or biopsy;
c. Patients with basic Mandarin listening and speaking skills, normal understanding and expression skills, and no communication barriers;
d. Patients undergoing fertility preservation therapy who have a desire to have children or need to reproduce;
e. Patients voluntarily participated in the study and obtained informed consent.

Exclusion Criteria

a. Patients with severe cognitive impairment or a history of mental illness;
b. Patients with serious diseases of other systemic systems.

Withdrawal Criteria

a. Patients voluntarily withdrew from the study;
b. The investigator concluded that the patient was medically unfit for further participation in the study.

Sample

The sample size was determined based on the saturation of information, that is, when no new content emerged from the interview data. A total of 17 potential participants were approached in this study, among whom 2 participated in the pre-interviews, and 4 refused to join due to their unwillingness to self-disclose. Finally, 11 patients who underwent fertility preservation after breast cancer treatment were formally interviewed, including 6 cases of oocyte cryopreservation and 5 cases of embryo cryopreservation. Their ages ranged from 22 to 43 (31.09 ± 6.88) years old. The interview data were coded with Arabic numerals, and the general information of the research subjects was presented in Table 1.

Procedure

Development of the Interview Guide

Prior to the formal interview, the research team conducted a discussion through literature review combined with clinical experience, according to the research purpose, and formulated a preliminary interview outline. 2 team members (1 associate chief nurse and 1 master nurse) conducted a preliminary interview with one breast cancer patient undergoing embryo cryopreservation and another undergoing oocyte cryopreservation. According to the interview results, the research team discussed and revised the interview outline as follows.

a. When you had breast cancer and learned that breast cancer treatment could affect fertility, how did you feel about fertility?
b. How do you obtain information about fertility preservation?

Table 1 General Information of Interviewees (n=11)

No.	Age/ Years	Educational Level	Occupation	Marriage	Childbearing Situation	Residence	Average Monthly Household Income/Yuan	Duration of Breast Cancer Diagnosis/Month	Fertility Preservation Types
N1	38	Junior high school	Clerk	Divorced	A son raised by ex-husband	Countryside	3000~5000	9	Oocyte cryopreservation
N2	30	Bachelor degree	Housewife	Married	Childless	City	5000~10,000	4	Embryo cryopreservation
N3	40	Junior college	Engineer	Married	A girl	Township	>15000	3	Embryo cryopreservation
N4	43	Bachelor degree	Housewife	Married	A girl	Countryside	5000~10,000	4	Embryo cryopreservation
N5	32	Junior high school	Clerk	Married	A girl	City	5000~10,000	3	Embryo cryopreservation
N6	32	Junior college	Individual household	Divorced	Childless	City	>15000	5	Oocyte cryopreservation
N7	26	Bachelor degree	Salesperson	Married	Childless	City	>15000	3	Oocyte cryopreservation
N8	30	Junior college	Clerk	Married	Childless	Township	3000~5000	8	Oocyte cryopreservation
N9	26	Doctoral degree	Teacher	Married	Childless	City	>15000	4	Embryo cryopreservation
N10	23	Master's degree	Treasurer	Single	Childless	Township	5000~10,000	3	Oocyte cryopreservation
N11	22	Bachelor degree	Clerk	Single	Childless	City	5000~10,000	2	Oocyte cryopreservation

c. How do you feel during fertility preservation treatment?
d. What difficulties did you encounter during fertility preservation treatment, and how did you cope with them?
e. What support do you desire during fertility preservation treatment?

Data Collection

The interview was conducted in a quiet, private room with comfortable environment and seats to ensure that the interview process would not be disturbed and the confidentiality of the information would be protected. Prior to the interview, the interviewees agreed and signed informed consent. The interview process was conducted according to the interview outline, and the whole process was recorded. During the interview, the interviewees were encouraged to fully express their real experiences and feelings, listen carefully to their stories, and give feedback and follow-up in real time. Avoid induction and suggestion, observe and record the non-verbal behaviors of the interviewees, such as facial expressions, body language, voice tone, etc. The duration of each interview was determined by the respondents' answers. The shortest time was 35 min, the longest was 55 min, and the average interview time was 41 min.

Data Analysis

Data collection and data analysis were carried out simultaneously. After each interview, the researcher will transcribe the recording into text verbatim within 24 hours, record the non-verbal information during the interview, and verify any doubts with the interviewer in time. The text data were imported into NVivo 12.0 software, and Colaizzi 7-step analysis method was used to analyze the data jointly by two researchers:[16,17]

a. Read all interview materials carefully to get a holistic view;
b. Extract meaningful statements that are consistent with the research phenomenon;
c. Generalize and refine ideas from meaningful statements;
d. Seek common concepts or characteristics of ideas to form themes;
e. Relate the topic to the research object and describe the phenomenon completely;
f. State the essential structure that constitutes the phenomenon;
g. Return the results to the research object, verify the authenticity of the content, and integrate new data into the phenomenon description during the process.

During the data analysis process, the true insider's perspective is captured and presented, the richness is mined and presented as much as possible rather than superficially, every research decision is reflected upon, a reflective journal is written and a critical evaluation is made. At the end of the data analysis, the group conducts a re-listen session to correct and review the initial analysis of the text to ensure the accuracy and precision of the data.

Result

Physical Pain and Discomfort

Physiological Pain

Most patients reported increased sensitivity to painful stimuli after the diagnosis of breast cancer, with somatic pain brought on by the overlap of dual treatment for breast cancer and fertility preservation.

N2: After I got sick, I had less sex, and the pain and discomfort of the transvaginal ultrasound to monitor follicular development was pretty bad.

N10: (With tears in her eyes), I get nervous easily and follicle monitoring for vaginal ultrasound always uncontrollably raises my bum, which the doctor says adds to the pain during the test.

N4: In the past 2 weeks, I've gone through breast cancer surgery, the post-surgery scar pain hasn't subsided, and I'm dealing with oocyte retrieval operation!

N11: Injections hurt! I've been afraid of needles since I was a kid, and now I have to have ovulation injections every day, blood tests for hormones two to three days apart, and have to deal with all kinds of needles.

Tolerance of Physical Discomfort

Some patients reported that ovulation induction treatment for fertility preservation caused physical discomfort such as breast swelling, abdominal bloating and frequent urination.

N7: I've got a bit of a bloated stomach and I find it hard to breathe when I'm lying down. I find a cushion or a thick quilt on my back helps with the discomfort.

N9: Today is the 10th day of ovulation injections, and my stomach is as bloated as a big carp that is about to spawn!. (Laughs bitterly)

N11: I've got stomach cramps, nausea, no appetite.

N5: I always feel like I have to pee really badly, but when I go, I only pee a little bit.

N6: I felt swelling and pain in my breasts, and the doctor said it was related to the elevated hormones from the ovulation medication injections.

Heavy Psychological Burdens

Fertility Worries

The conundrum of fertility and survival presents patients with a challenging decision, necessitating a delicate balancing act between pursuing fertility preservation therapy and undergoing breast cancer treatment. Patients express a sense of apprehension regarding the unpredictability of breast cancer prognosis in the context of fertility preservation, while some individuals harbor significant concerns pertaining to fertility.

N1: I've got hormone-sensitive breast cancer, and I've had fertility preservation treatments. These might make my breast cancer grow faster, and there's a chance it could come back during pregnancy.

N3: While I was having the injections, my breasts were really swollen and painful, so I was worried the cancer was spreading quickly, and I couldn't sleep at night.

N6: I'm worried that treatment for my breast cancer will damage my ovaries, and I'm really sad at the thought of not being able to have children in the future.

N1: I've frozen my eggs, but I'm still not sure who would want to marry a girl like me who is physically handicapped and may not be able to have children.

N9: I'm worried that breast cancer might affect my intimacy with my husband. I've had a chat with my doctor about freezing some of my eggs. I'm going to have a few of them frozen and then paired with embryos, so that if I get divorced, at least I'll have some eggs that belong to me.

Self-Blame and Guilt

The financial burden of anti-cancer and fertility preservation treatments can be significant, often requiring additional care and support from family members. Some patients perceive the challenges faced by their family members as a result of their own treatment as a source of familial stress, leading to feelings of self-blame.

N2: My family is worried about my illness. I'm feeling really down.

N6: I don't know what I did in my past life to cause this problem and drag my family into it. (sighs)

N8: I quit my job because of my oncology treatment, and now I'm dependent on my parents for money. Although some of the cost of fertility preservation treatments can be put towards my health insurance, it's still very stressful.

For traditional Chinese families, pregnancy and childbirth is the expectation of the whole family, and women bear the responsibility of bearing offspring. In instances where childbirth becomes challenging, patients may experience feelings of guilt under the pressure exerted by their families and themselves. Breast cancer is a hereditary disease that runs in families, and offspring are also at risk of developing the disease. Some patients experience feelings of guilt due to concerns about transmitting the disease to their offspring.

> N9: I might also pass my cancer genes on to my children, I don't want to think that the next generation might have to suffer the same pain I did. (weeping)
>
> N5: My husband has been there for me through my breast cancer treatment, and I'd feel guilty if I couldn't make his dream of becoming a dad a reality.
>
> N4: My daughter is eight and all her classmates have brothers or sisters. She'd really like one too, but unfortunately, I can't have children. I'm really sorry about that.

Loneliness and Helplessness

During treatment, divorced or unmarried patients lack the support and companionship of their partners. Some patients are afraid that their family and friends will worry and are reluctant to seek help from them. The lack of opportunities to talk and share their feelings makes some patients feel lonely. The inevitable exposure of the breasts and perineum during treatment also makes patients feel helpless.

> N6: I'm divorced and single, and people show up in pairs, so I'm left alone in the waiting area.
>
> N8: It's not good to talk to friends about things like this (fertility preservation), but I also don't want my parents to worry, so I go to the hospital on my own each time.
>
> N4: I'm often feel exhausted and don't have anywhere to talk about it.
>
> N10: I feel uncomfortable and helpless about exposing the privacy of my body for breast cancer treatment and fertility preservation treatment.
>
> N11: The unpleasant experience of having to expose the upper half of my body for breast treatment exams and the lower half of my body naked for fertility preservation treatments was something I had to deal with yet many times!

Bias from Others and Self

The patient suffers from altered self-image, and after radical mastectomy for breast cancer, the patient finds it difficult to adjust to the missing breast. Patients described trying to cover up as much as possible by matching clothing and avoiding seeing the mutilated body in the mirror, as patients lacked a sense of self-identity. Some patients described being looked at differently when sharing their experiences with others, not being understood, and enduring prejudice from others and self.

> N5: While I was waiting for my consultation, some patients looked at me differently when they found out about my condition. They said things like, 'You are risking your life! Why don't you start the breast cancer treatment quickly, come here (to the fertility department) and fool around, you're really not afraid of death!
>
> N7: She stroked her lower abdomen and then pointed to her forehead, saying, I don't dare to look in the mirror, and during this time of ovulation stimulation injections, my stomach has risen to such a large size, and one side of my breasts is flat, so I'm just a weirdo.
>
> N8: One of my breasts is gone, and no matter how much attention I pay to my dress code, I can't hide the flaws in my femininity.

Actively Seeking and Benefiting from Ways of Coping with Illness

Life Over Procreation

The value of life is paramount, and the process of cancer treatment can have a significant impact on fertility. However, some patients have reported that, when making decisions regarding fertility preservation treatment, they prioritize survival over fertility, placing their own lives above the preservation of their fertility.

N2: In the face of this diagnosis, I prioritized my own well-being, opting for a surgical excision of the tumor and subsequent egg freezing.

N3: My lover says that losing a life makes ideals vain and that controlling the growth of a tumor is more important than wanting a child.

Hope, Confidence and Courage

Women with breast cancer who underwent fertility preservation treatment generally expressed that, despite the uncertainty they faced, the treatment offered a perspective on a possible future, including the possibility of becoming mothers. Despite the difficulties and challenges, some of the patients expressed hope and anticipation for the future, which was crucial for their psychological adjustment and allowed them to demonstrate strength, courage and confidence in the future.

N7: The road ahead won't be easy, but this treatment has given me hope. I feel like my future is full of possibilities!

N8: Gaze ahead (with a vision for the future) and say, I am still young, the cure rate for breast cancer is not low, and I want to get married normally, start a family and have children of my own.

N2: I told my husband I'd fight for the children.

N9: Fertility preservation therapy gives me a sense of continuity in life.

N4: My fellow patients say that the egg retrieval process is the hardest part, but I'm not worried about it. It's definitely worth the effort to have a child.

N9: Maybe in the future I won't need to use frozen eggs, I've discussed with my lover that I will try to conceive naturally when the disease is under control, after all I'm still young. (confident)

Positive Coping with Illness

Some patients have been observed to possess a more positive understanding of their own understanding of life and living, and are able to maintain an optimistic mindset, better face the challenges of treatment and life, and adopt a healthier diet and lifestyle to positively cope with their illnesses during the course of treatment.

N3: I never went to bed after midnight, but now I'm in bed by 10 p.m. every night.

N5: I'll make sure to schedule some outdoor time every day.

N2: I get bombarded with diet, nutrition and health info on social media because that's what I'm interested in.

N9: My family and I don't usually order takeaways anymore, it's safer and healthier to make our own food!

N6: I don't drink milk tea and coffee anymore, but I used to drink them every day.

N4: It's really important to listen to your doctor, get plenty of exercise, cooperate with treatment, and follow the required review and physical examinations.

Adequate Social Support

Some patients reported experiencing a sense of profound emotional support from their family, friends, and medical staff during the treatment process. This support was identified as a significant factor in their ability to maintain a positive

attitude. Furthermore, the development of social connections among patients undergoing fertility preservation treatment has been observed, with some patients establishing friendships with others in similar circumstances. These peer relationships have been noted to provide a supportive network for patients to share their experiences and emotions.

N1: The mutual support of my fellow patients makes me feel like I'm not alone in my battle.

N6: While I was waiting for my consultation, I met a sister who had the same disease as me and both of us had to have fertility preservation. We became good friends and encouraged each other.

N3: After I got sick, my mother-in-law followed the doctor's advice on nutrition and made different kinds of food to suit my taste.

N4: It's really comforting to know that so many people care about me and have my back. It gives me the strength to face my treatment with courage.

N9: For now, my husband's cancelled all his social commitments so he can be with me.

N11: I'm not alone, my family, friends, and doctors are fighting alongside me on many levels.

N5: The doctors are actively helping me, and I am confident about the future.

Growth Follows in Adversity

Some patients reported experiencing personal growth from having to re-examine their lives in the face of the challenges of breast cancer and fertility preservation treatments, as well as discovering their own strength and resilience in the face of adversity.

N1: This tough experience has made me realize that I'm strong, taught me how to deal with problems and appreciate what I've got.

N11: You know what? I was afraid of needles when I was a child, but now I can learn to inject myself with medication for fertility preservation treatments.

In the face of the fragility of life, many patients initiate a process of reflection on the aspects of life that are of true importance, such as family, friendships and personal happiness. In order to cope with the emotional turmoil associated with the treatment process, many patients have been observed to learn to express their feelings and needs more effectively. The benefits of this include a reduction in psychological burden and an improvement in communication skills, as well as the promotion of healthier relationships.

N9: I am now focusing on healthy living and spending more time with family and friends.

N11: I'm willing to pour my thoughts out to my family and friends, and that's a good feeling.

Lack of Fertility-Related Information Support

Lack of support for fertility information from specialists during the consultation process. After diagnosis, when faced with decisions about breast cancer treatment and fertility preservation treatment, most patients want to obtain timely expertise on disease treatment and fertility preservation treatment from breast specialists and reproductive healthcare professionals to facilitate a quick decision-making process for fertility preservation. Due to the uneven distribution of healthcare resources, not all hospitals are equipped to provide fertility preservation treatments, and some patients are unable to receive information and support on fertility preservation during their visits.

N1: Medical information resources are not the same everywhere, and my doctor at the local hospital did not suggest preserving my fertility.

N2: I want healthcare professionals to explain why fertility preservation is important using some examples. This will help me to decide as soon as possible.

N4: I didn't realize the consequences of breast cancer treatment on fertility issues until I accidentally swiped the information from the 'Little Red Book'. (an APP)

N8: I had already received one radiotherapy treatment before I realized the importance of fertility preservation and then came to the fertility department for consultation.

In addition, some patients also want policy support.

N7: I am worried that pregnancy may cause a relapse or aggravate my condition, and I hope that I can solve my fertility problem through surrogate motherhood.

Discussion

Enhancing Pain Management in Women with Breast Cancer Undergoing Fertility Preservation

This study posits that women diagnosed with breast cancer encounter acute pain during the diagnostic process, treatment modalities, and fertility preservation therapy. The pain is primarily attributed to surgical incisions, transvaginal ultrasounds, the improper use of speculums, ovulation induction injections, and frequent blood draws for hormonal variable monitoring.[18] In addition to various invasive procedures, the presence of muscle tightness and avoidance behaviors, which are often the result of excessive patient tension, has been demonstrated to exacerbate pain during treatment. Research has demonstrated that the perineal vestibular area is more sensitive in breast cancer patients than in the general population, resulting in them experiencing more severe painful stimuli.[19] In addition to pain perception, somatic complaints associated with ovulation induction therapy have been reported during fertility preservation in breast cancer patients, including chest distension, abdominal bloating and urinary frequency, which have been associated with changes in hormone levels and compression caused by the increased size of the ovaries after ovulation induction therapy.[20] Pain and physical discomfort not only affect the patient's physical state, but may also affect his/her psychological and emotional well-being, creating fear and avoidance of treatment and ultimately affecting the success of the pregnancy.[21,22] Effective pain management should be practiced in nursing practice to reduce somatic discomfort and improve the overall patient experience of care.[23]

Focus on the Psychological Complexities of Women with Breast Cancer Undergoing Fertility Preservation

This study highlights the complex psychological experiences of women with breast cancer during fertility preservation treatment, which include profound anxiety and restlessness, feelings of self-blame and guilt, feelings of loneliness and helplessness, and biases from the self-versus the community, in line with Ghaemi et al.[24] The paradox of reproductive decision-making is the most important challenge faced by breast cancer patients. The dilemma of choosing between cancer treatment and fertility preservation leads to a state of anxiety, fear and anxiety, which can lead to insomnia and a constant state of anxiety in daily life, creating a vicious circle that can increase the physical burden.[25] In addition to fear, feelings of loneliness and helplessness are not uncommon among women with breast cancer. Lack of family support, expensive treatment, genetic risk of the disease, exposure of body and privacy due to fertility preservation treatments, and changes in self-image during cancer treatment place a great psychological burden on the patient.[26–28] The traditional Chinese concept of fertility is that women have the task of bearing children and carrying on the family line, and that the issue of fertility is not only a personal issue, but also a reflection of the needs of the family and the responsibilities assigned to women by society.[29] Some breast cancer patients feel guilty and blame themselves for having children, especially in rural or religiously influenced areas where traditional attitudes are strong, and family and social prejudices can lead to exploitation and abuse with even more serious consequences.[30,31] Therefore, how to enable patients to correctly understand the disease and alleviate their adverse emotions is the key focus for healthcare

professionals to pay attention to. At different stages of cancer treatment and rehabilitation, patients' different needs and changes in psychological status related to childbirth should be continuously assessed, and individualized and precise support should be given to patients to alleviate their worries, satisfy their emotional needs and realize their social values.[32,33]

Enhancement of Positive Coping Skills of Women with Breast Cancer Undergoing Fertility Preservation

The results of the study showed that women with breast cancer experienced post-traumatic growth during fertility preservation treatments, not only demonstrating strength and confidence in fighting the disease, but also producing positive behavioral changes, consistent with An et al.[11] This behavioral change may be related to psychological resilience, and research has shown that higher psychological resilience improves an individual's ability to adapt in trauma, and that increased psychological resilience reduces psychological stress, improves treatment adherence, and produces positive coping,[34] for example, dietary changes, regular work schedules, increased physical activity, etc., to support treatment outcomes and improve quality of life.[35] Some patients expressed optimism and hope for the future as they underwent treatment, believing that even in the shadow of cancer, they could create possible happiness for themselves and their families.[4] However, some studies suggest that breast cancer patients have relatively low levels of psychological resilience and that disease recovery and quality of life can be facilitated by improving disease cognition, physical activity, and strengthening family and social support,[36,37] which is consistent with the findings of this study. Deep social support, post-traumatic growth and hope for the future have been the driving force behind their coping and perseverance in treatment.[38] Healthcare professionals should value the role of these positive psychological experiences and help patients better cope with the treatment process by providing comprehensive care and support. Improving patients' knowledge of the disease, implementing personalized psychological guidance, providing peer communication, strengthening family support, improving psychological resilience, and promoting patients to face the disease with a positive mindset.[36,39]

Strengthening Information Support for Women with Breast Cancer Receiving Fertility Preservation

This study suggests that women with breast cancer lack access to resources and channels for professional information, decision support and policy help in fertility preservation treatments, consistent with Chen et al.[40] The lack of professional guidance and the uneven distribution of healthcare resources have resulted in unmet needs for reproductive decision-making among breast cancer patients, who are able to seek out available resources on their own, yet the information they obtain on their own is very heterogeneous, unreliable and of poor quality, and therefore requires specialized expertise.[41] Patients need more direct professional guidance and decision support for complex treatment choices in order to help them assess the pros and cons of various treatment options and reduce uncertainty.[37] To meet the needs of patients, healthcare providers need to strengthen interdisciplinary cooperation and training to bridge the information gap. At the same time, multidisciplinary teams should be established to provide personalized counselling and case studies to help understand the importance of fertility preservation.[42,43] In addition, some patients would like to receive support at the policy level, such as surrogacy and other flexible reproductive choices. Healthcare professionals should actively explain the boundaries of assisted reproductive technology and provide more diversified reproductive choices to meet the treatment needs of patients and to safeguard their psychological and physiological health.[44] At present, online applications, teleconferencing software and communication software are used in disease prevention, screening and diagnosis, remote check-ups and post-discharge family support in breast cancer and assisted reproduction treatment, and a decision support system that enriches professional online information support is one of the avenues that can be explored.[45]

Conclusion

In this study, semi-structured interviews were conducted with 11 female patients undergoing fertility preservation treatment for breast cancer, and the results suggest that this group suffers from pain and somatic discomfort, heavy and complex

psychological burdens, and unmet supportive care needs during fertility preservation treatment, and that the majority of the patients are able to positively seek out ways to cope with their illness and benefit from them. Professionals need to provide multifaceted support to women undergoing fertility preservation treatment for breast cancer, including pain management, psychological support, positive lifestyle adjustments, reinforcement of positive psychological experiences, and identification and fulfillment of unmet care needs, in order to improve patients' quality of life and treatment experience.

Patient Consent

After explaining the purpose and content of the study to the patients, informed consent for this study was obtained from the patients and the paper version of the informed consent form was signed. All patients have given consent for publication of anonymous responses and direct quotes. All patient information in the study will be anonymized to eliminate the risk of disclosure.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare that there is no potential conflict of interest for this work.

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