Pain catastrophising in Chinese patients with breast cancer during postoperative chemotherapy: a qualitative study

Yanting Zhang,1 Wenjia Long,2 Hongying Wang,3 Jingyi Wang,4 Chen Tang,4 Jing Ma,1 Jun Zhong4


ABSTRACT

Objective To investigate the pain catastrophising in patients with breast cancer during postoperative chemotherapy.

Methods Objective sampling method was used to select patients with breast cancer who underwent breast surgery and received chemotherapy in a third-class hospital of Wuhan from October to December 2022 through semi-structured interview. The interview data were sorted out and analysed by content analysis method.

Results A total of 11 patients were interviewed and five categories were summarised: (1) Physical memory of pain; (2) the special meaning of time; (3) disease treatment and prognosis; (4) interpersonal communication and coping; (5) personal behaviour and growth.

Conclusion Patients with breast cancer have adverse pain experience during postoperative chemotherapy. The evaluation and screening of psychological variables such as pain catastrophising should be strengthened to provide new ideas for pain management.

INTRODUCTION

At present, the prevalence and mortality of cancer are substantially increasing year by year worldwide, and breast cancer is the most common female malignant tumour disease.1 With the widespread popularisation of breast cancer screening and the optimal updating of treatment pathways, among the patients with breast cancer, the survival rate has been improved significantly and the treatment and health management of patients have become the focus of current attention. Patients with breast cancer experience many physical and mental symptoms in the course of disease treatment, especially during chemotherapy, patients are more likely to suffer pain, fatigue and potential other adverse events.2 Studies have shown that more than one-third of patients with cancer experience moderate-to-severe pain during disease treatment.3 Ho et al found that patients with breast cancer undergoing chemotherapy were more likely to suffer pain, fatigue and potentially other adverse events.4 However, due to poor pain control, patients often appear with negative and pessimistic emotions.3 Pain catastrophising refers to the negative recognition of painful dangerous events by individuals, it is one of the most important psychological variables in pain management and has a great impact on both disease treatment and catastrophising health of patients.5 Current studies on the catastrophising of cancer pain are status quo investigations mostly, ignoring the feelings and experiences of patients to a certain extent.6 There is still a lack of understanding of the feelings and experience of pain catastrophising from the perspective of patients with breast cancer during postoperative chemotherapy in China. This study explored the psychological dimension of pain through semi-structured interviews, in order to provide reference for physical and mental management of pain and enrich the research content of pain in patients with breast cancer during postoperative chemotherapy in this field. At the same time, it is also a good intervention for the pain of patients with breast cancer during postoperative chemotherapy.
OBJECTS AND METHODS

Research tool

1. Pain Catastrophising Scale: Designed by Sullivan et al., this scale has 13 items and is divided into three dimensions: repetitive thinking, amplification and helplessness. Each dimension has a high internal consistency. Each item was scored by Likert 5-point scale, and the total score was 52 points. The higher the score, the more serious the catastrophe. Xu et al. conducted cross-cultural debugging, which can be used to evaluate the level of pain catastrophisation in patients with chronic pain in mainland China. The simplified Chinese version adjusted by Shen et al. was used in this study.

2. Numerical Rating Scale for pain: Numerical Rating Scale (NRS) is a patient-centred pain assessment tool. The tool uses a total of 11 numbers from 0 to 10 to represent different degrees of pain, with 0 as no pain, 1–3 as mild pain, 4–6 as moderate pain and 7–10 as severe pain.

Research object

Patients with breast cancer undergoing breast surgery and receiving chemotherapeutic adjuvant therapy in an upper third-class hospital in Wuhan from October to December 2022. (1) Inclusion criteria: ≥18 years of age, patients diagnosed with stage I–III breast cancer (according to the tumour, node, metastases), patients who have completed at least the first cycle of postoperative chemotherapy, volunteer to participate and coordinate with chemotherapy, patients who have received modified radical mastectomy or breast conserving surgery, no serious complications after surgery, pain disaster score ≥28 points, NRS score ≥7 points. (2) Exclusion criteria: severe complications, serious postoperative complications, postoperative recurrence or distant metastasis, preoperative adjuvant radiotherapy/chemotherapy, cognitive dysfunction. A total of 11 patients with breast cancer were selected, all women, ranging in age from 35 to 72 years old, with an average age of 50.72 years old. Five patients lived in cities and six in rural areas. Three had college education or above, four had junior high school education, one had senior high school education and three had only primary school education. The marital status of nine persons was married and two persons were widowed. In terms of employment situation, two were still working, seven were housewives and two were retired. In terms of disease data, most of the interviewed subjects were treated with modified radical resection (10/11), and the chemotherapy regimen was EC (epirubicin+cyclophosphamide), and the chemotherapy cycle was 2–7 weeks. Other disease-related data of the interview subjects are shown in Table 1.

Research methods

Determine the interview outline

According to the search results of literature review, the interview outline was structured first, and then revised according to the consultation with experts, and the pre-interview test result. The final outline of the formal interview is as follows: (1) Can you tell me about your living conditions (physical, emotional, social, etc) during chemotherapy? (2) Can you tell me your feelings and thoughts about pain, how do you view pain? (3) If you have had pain in the past, can you describe what kind of pain it was? (4) Have you ever felt pain during chemotherapy, and what is your experience? What factors do you think contribute to pain during chemotherapy? (5) What would you do when you feel pain, and how would these actions affect you? (6) Is there anything else you would like to say about this interview?

Data collection methods

Initial screening of eligible patients was performed by means of a review of electronic medical records. The general information about the patients was obtained,

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>WHO staging</th>
<th>Surgical method</th>
<th>Chemotherapy regimen</th>
<th>Current chemotherapy cycle</th>
<th>Basic disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>2</td>
<td>Modified radical mastectomy</td>
<td>EC</td>
<td>3</td>
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</tr>
<tr>
<td>P2</td>
<td>2</td>
<td>Modified radical mastectomy</td>
<td>EC</td>
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<td>P3</td>
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<td>2</td>
<td>Modified radical mastectomy</td>
<td>EC</td>
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</tr>
<tr>
<td>P5</td>
<td>3</td>
<td>Modified radical mastectomy</td>
<td>EC</td>
<td>7</td>
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<tr>
<td>P7</td>
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<td>EC-T</td>
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</tr>
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<td>P8</td>
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<td>EC</td>
<td>4</td>
<td>Hypothyroidism</td>
</tr>
<tr>
<td>P9</td>
<td>1</td>
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<td>EC</td>
<td>2</td>
<td>2 years of diabetes</td>
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<tr>
<td>P10</td>
<td>2</td>
<td>Modified radical mastectomy</td>
<td>EC</td>
<td>4</td>
<td>1 year of diabetes</td>
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<tr>
<td>P11</td>
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<td>EC</td>
<td>3</td>
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</tr>
</tbody>
</table>

EC, epirubicin+cyclophosphamide; EC-T, epirubicin+cyclophosphamide+docetaxel.
including age, marital status, education level, medical insurance type, family per capita income, religious belief, menopause, disease type and classification, surgical method and chemotherapy course. A semi-structured face-to-face in-depth interview was conducted by the investigator to the enrolled patients. The researchers used a voice recorder to record the recordings while observing the non-verbal performance of the patients and taking field notes. The interview lasted about 40–60 min. The interviewing principle was that patients explained their real feelings until no new information appeared.

**Data analysis and quality control**

Before the formal interview, two to three patients were pre-interviewed (not included in the analysis of results), so as to determine the criteria of the interviewee, justify the interview outline and improve the interviewers’ skills. Within 24 hours after the end of the interview, the researcher should immediately conduct a preliminary collation and analysis of the recorded materials and field notes. After the interview, researchers repeatedly listen and read the interview materials, the problems in the interview, to recognise and analyse the problems that occurred in the last interview and thus avoid it in the next interview. The recordings were transcribed by transcription software, followed by a manual correction and repeated listening by two people was used to further verify the transcription content. The transcript should be combined with the researchers’ on-site notes and returned to the interviewees for confirmation. If there is any doubt or ambiguity, the interviewees should be asked for clarification. The traditional content analysis method recommended by Hsieh and Shannon was used to encode, classify and refine the data. The specific research steps are as follows: (1) The researchers carefully and repeatedly read the interview materials. Until you get a sense of immersion in the data and get familiar with the overall content of the data; (2) analysis line by line, marking significant statements and open coding; (3) comparing and classifying similar or related codes to form themes and subthemes; (4) define themes, subthemes and codes and extract some representative examples from the data.

The study protocol adhered strictly to the guidelines outlined in the 1964 Declaration of Helsinki.

**Patient and public involvement**

Patients or the public were not involved in the design, conduct, reporting or dissemination plans of this research.

**RESULTS**

A total of 5 categories and 15 themes were summarised, as detailed in table 2.

**Category I: Physical memory of pain: past and present**

**Theme 1: Past pain events affect pain attitudes**

In this study, when referring to pain, the interviewees were affected by the past pain memory, and most of them avoided the pain during chemotherapy. This effect was mostly negative, which would make patients unconsciously associate with the previous unpleasant pain experience. The interviewees felt unpredictable and uncontrollable pain, full of uncertainty and fear. P1: ‘This kind of thing used to be not much, now the most important thing is the pain of the bone after the injection, because as a patient, you do not know when the pain will occur, and you are completely unprepared’. P2: ‘I think this is more scary than giving birth! Anyway, I have been in pain for the whole month of giving birth, and I can’t close the wound, so now I have a big reaction to the pain, and the pain is magnified in my heart’. P11: ‘In fact, I think giving birth to a child is even more painful than this. If I think this, I

<table>
<thead>
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<th>Categories</th>
<th>Themes</th>
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<td>Theme 1: Pain exceded expectations</td>
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<td>Category 3</td>
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<td>Theme 2: Insufficient knowledge of pain management</td>
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<td>Ambivalent feelings towards caregivers</td>
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<td></td>
<td>Theme 1: The sense of distance from healthcare professionals</td>
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<td></td>
<td>Theme 2: Mutual communication among patients</td>
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<td>Theme 4: The weakening of social interaction</td>
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<tr>
<td>Category 5</td>
<td>Desire to return to normal</td>
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<td>Theme 2: Thinking about the meaning of life</td>
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<td>Theme 3: Inner loneliness</td>
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do not know the pain of anesthesia when I do surgery. I think the main thing is fear’.

**Theme 2: pain exceeded expectations**

Most of the interviewees believed that the occurrence of pain is an inevitable course after receiving chemotherapy drugs (EC: epirubicin+cyclophosphamide). Although they knew that pain would occur in theory and were psychologically prepared, the actual pain experienced during chemotherapy drug infusion far exceeded their psychological expectations. P2: ‘I still have pain in the place where the operation was done. Sometimes the pain is quite severe. When you change your position, it is particularly painful’. P6: ‘Chemotherapy could cause stomach ache, and belly pain, because I know it is a normal reaction, so I can accept it psychologically. But then the wound did not grow well, and after each chemotherapy the wound rotted and deteriorated. I did not expect this surgery wound to cause me so much trouble. I had no mental burden to myself’. P10: ‘At the beginning, I thought it was OK. On the one hand, my tolerance is still strong. On the other hand, I think this is not my own pain. After several chemotherapy treatments, it became more and more uncomfortable. There was no signs for prediction, but it hurt anyway’.

**Theme 3: pain interacts with other symptoms**

Some respondents indicated that other symptoms may interact with pain during chemotherapy to cause more intense pain, especially after intravenous chemotherapy drug (EC) infusion. The main current disturbances affecting pain are limited activity, difficulty concentrating, worsening of other physical symptoms, symptom-related long-term health problems such as sleep disturbances, weakness, fatigue and negative psychological conditions such as anxiety, depression and irritability. P7: ‘Because I have low white blood cells, I have been playing long acting white needle before. Sometimes it’s tolerable, but it interferes with sleep a little bit, because you just have that kind of pain all over your body, and then you can’t sleep when you lie down, and it’s even worse’. P8: ‘Every time you come to the hospital for chemotherapy, it is like this. As soon as the potion goes in, the whole person is uncomfortable, mainly the knee joint there is also very painful, basically lying down and does not want to move’. P11: ‘The pain is mainly affecting life, because if you are sure of the pain, you may be very agitated, and then it will affect the pain, it will also cause the feeling of vomiting’.

**Category 2: special meaning of time: existence and deprivation**

**Theme 1: pain and the periodicity of treatment**

Most of the interviewees emphasised the temporal characteristics of pain during chemotherapy, presenting the characteristics of ‘aggravating, relieving and aggravating’ corresponding to the chemotherapy cycle, which was the hallmark of treatment. This pain synchronised with the treatment makes the patient have a resistance and fear of chemotherapy, and struggle between treatment and no treatment. P5: ‘The pain is the same as a sharp prick in the chest. Sometimes it is worse, sometimes it is better. Generally, it will take ten days to recover after going home. Only the fifth time, the pain was so severe that I came to the hospital two days in advance’. P6: ‘I usually take a week to get rid of this pain a little bit, a little relief, a week to start again. But sometimes I feel too hard, I want to finish this time and the next time, and I’m afraid to come to the hospital again’. P9: ‘Because it has a cycle of its own, it must hurt for a few days. It usually starts about three to five days after I get home. After the worst of it, I feel better and I want to get it over with’.

**Theme 2: pain occupies life**

The patients interviewed all mentioned that the pain generated during postoperative chemotherapy permeates their life bit by bit, affecting all aspects of the body. Their experience is full of severe unbearable pain, which brings patients physical and mental suffering and endless pain. P3: ‘When it hurts, it really hurts. The pain level could up to ten in the NRS scale. I always try not to think bad things, can’t think. It was like the flesh was shaking. It was so hard!’ P7: ‘Sometimes you think about it, you think about it all the time, you can’t ignore the pain. But there was a time when it didn’t stop hurting for four days, basically for 24 hours, and I was completely out of it, and I really wanted to die. I just want to give up. I’d rather not treat it’.

**Category 3: disease treatment and prognosis: belief and doubt**

**Theme 1: pain affects treatment confidence**

Some interviewees said that the occurrence of pain was a normal phenomenon and was the result of treatment. Most interviewees believed that surgical trauma and chemotherapy drugs were the main factors leading to pain, the chemotherapy drugs here are mainly EC. However, when the intensity of pain is too high to endure, it is easy to produce negative emotions for disease treatment. P1: ‘If there is no pain, I may accept the degree better, and sometimes the pain is bearable. But sometimes, I worry about affecting my treatment’. P2: ‘The pain must have an impact on my treatment. When I have severe pain, I will resist the treatment. If the pain goes on, I would rather die than cooperate with the treatment’. P3: ‘In fact, sometimes I’m in so much pain that I dare not say it hurts, because it hurts so much that the doctor will give you different treatment. You feel like you have to put up with it because you’re afraid it’s affecting your treatment’. P6: ‘Just after this time, my chemotherapy stopped. The doctor told me not to do the next one. One is that the wound is always bad, and the white blood cells are too low for fear of accident’. P11: ‘If the pain was unending, I would choose whether I would treat the problem or not’.

**Theme 2: insufficient knowledge of pain management**

Respondents generally have a wrong understanding of pain management during postoperative chemotherapy,
and often choose to tolerate when pain occurs, for fear of causing trouble to the people around them or affecting the doctor’s treatment plan. P2: ‘I had that kind of analgesic pump before the operation. It may have a little effect, but I didn’t use it either. Listen to others say that it is not good to use, anyway, I try to resist’. P7: ‘Even the medicine can’t help me, because sometimes I always feel that after taking the medicine, I only feel free of pain for a few hours, and then I feel pain again. I don’t want to take medicine, and I think it’s better not to take it if it doesn’t last long’. P10: ‘This seems to need to be solved technically. Like the doctor said you such a big wound, if would be so rare and ridiculous to no experiencing pain. It is useless even if using the medication, and it may be harmful to my nerves, or even could make me become less intelligent’.

**Category 4: interpersonal communication and coping: dependence and withdrawal**

**Theme 1: ambivalent feelings towards caregivers**
Some interviewees reported negative emotions, such as fear, anxiety and depression during chemotherapy, which were particularly severe when experiencing pain. Physical discomfort makes patients more dependent on their primary caregivers (mostly spouses). P3: ‘Anyway, if I suddenly feel very ill, I will lose my temper. Because my husband spent 24 hours with me, I can only get angry with him’. P4: ‘I have a child, before she quit her job to take care of me, economic pressure is quite big, all is her money, I don’t want to drag the child’. P5: ‘Sometimes I feel numb in my hands and feet. My husband will give me a massage, a touch will be better. But sometimes I get really annoyed and angry at my husband’. P7: ‘For example, I like to look at my phone and have many relatives because I am sick. Everyone, no matter who they are, like my aunt, they send you a video, talk to you, or feel much better’.

**Theme 2: the sense of distance from healthcare professionals**
Patients are more sensitive during treatment and need more empathy and attention from healthcare professionals. Most respondents in this study did not seek help and support from medical staff in time when experiencing pain during postoperative chemotherapy, and there were problems such as delayed communication time, asymmetric information between the two sides and communication barriers. P2: ‘I am very afraid of pain. Sometimes doctors and nurses may be better if they speak softly and take more care’. P5: ‘I don’t say it when it hurts, and I won’t tell anyone. I’m the only one who knows. And I’m afraid of bothering the doctor’. P8: ‘I feel that I need more care from the doctor. For example, before chemotherapy, you may tell me that this injection may cause your pain. I have a psychological preparation’.

**Theme 3: mutual communication among patients**
Some interviewees expressed that they were more willing to communicate and share with patients due to the existence of similar experiences. However, communication between patients may also convey wrong or negative information, which may lead to wrong guidance for patients and aggravate their worry and fear. P6: ‘At the beginning, I would also think how can it hurt, and then the patients here told me that many of them have it. I feel a little relieved’. P9: ‘I sometimes think a lot, especially after some patients speak, they are more afraid. I wonder if it’s going to happen to me’. P10: ‘Patients must have the same topic, I think I can learn a lot from them’.

**Theme 4: the weakening of social interaction**
Patients with breast cancer often face impaired body image, limited activity and adverse chemotherapy symptoms during chemotherapy, which greatly interfere with normal social interaction. P1: ‘I don’t like going out very much, sometimes it’s too noisy. When it hurts, the louder it is, the more painful it is and the more sensitive it is’. P3: ‘When it doesn’t hurt, I can do anything. You can’t do anything when you’re in pain, and everything else is affected’. P4: ‘I don’t have any activities. I don’t even go out. I feel like I’m being rejected by people with breast cancer’. P6: ‘Ever since I got this disease and started chemotherapy, my physical strength has become so bad that I can’t do anything I want to do. I didn’t go to senior college either. I just stayed at home’. P11: ‘After the start of chemotherapy, the whole person looks bad, hair is also thin, I dare not go out to see people’.

**Category 5: personal behaviour and growth: health and disease**

**Theme 1: desire to return to normal**
Patients with breast cancer often have serious physical and mental confusion during chemotherapy, and negative emotions continue to accumulate. Patients often struggle to adjust to the changes and the negative effects of pain, to lower expectations and to find a balance in a new life. P2: ‘When you are in pain, you will find a most balanced point, as if you feel that you are still a healthy person and live well’. P3: ‘Sometimes I still think a lot in my heart. I really want someone to give me some psychological guidance or help’. P5: ‘Now I feel tired after a short walk, but I want to go out for a walk. I can get some fresh air in the morning and get some sunshine in the afternoon’. P6: ‘Mentality is very important, because I have also heard that there are a lot of patients who are not responsible, and they have maintained for decades. I just want to get well soon. I want to go out and see more’. P7: ‘Sometimes I think I might as well die like this, but I have a one-year-old child and I really want to recover’.

**Theme 2: thinking about the meaning of life**
The diagnosis of cancer is a huge blow to patients and their families, and in the face of the fact of illness, interviewees expressed a deep sense of powerlessness, experienced self-questioning, tapping their own strength and finally affirming their own value. P3: ‘I think a person’s state of mind is very important, having this disease is like
suddenly falling from heaven to hell. I couldn’t handle anything before I got sick, and now I’m a little surprised that I can handle so much stress’. P6: ‘I’m now in my seventies and I’m living enough, I’m going to die, I’m very calm now, plus I also submitted an application for body donation, hoping to help others in the end’. P10: ‘I have been a Christian for some time and now I can’t go to church to pray because of my illness’. Anyway, I think religion has a psychological effect, and I think that good people will be rewarded.

Theme 3: inner loneliness
The thought of pain catastrophising seriously affects the pain experience of patients during postoperative chemotherapy, and patients with breast cancer suffer double blows in physical and mental aspects. P4: ‘It hurts to treat a disease at any time, and it’s useless if you always talk about it, it’s better not to say it, and the family is also uncomfortable’. P7: ‘I couldn’t resist telling the doctor that it was really painful, and they asked me if I was particularly afraid of pain. In fact, I am not, this kind of pain is really difficult to express, this only I can experience’. P9: ‘This painful feeling is in me, I can’t shake it off, only I know what it feels’. P11: ‘Although I sometimes communicate with patients, everyone feels pain differently, and it is useless for others to say more’.

DISCUSSION
Pay attention to and improve the current situation of pain management
Between 25% and 60% of patients with breast cancer, regardless of the grade, will feel pain during the diagnosis and treatment of the disease. Pain symptoms after adjuvant chemotherapy are more prominent, mainly occurring in muscles, bones, joints or abdomen. The sensory pain of limbs in patients with breast cancer is considered to be difficult to ignore. In this study, the interviewees had a high score of pain catastrophising. All of them experienced moderate-to-severe periodic pain during chemotherapy, and some reported that it was difficult to relieve continuously, which had a profound impact on their daily life. Catastrophic thoughts of pain mediate the relationship between mental state and pain intensity, which may lead to increased susceptibility to pain. In addition, patients often experience a variety of symptoms during breast cancer chemotherapy, such as fatigue, hair loss, nausea, appetite changes and sleep disorders. The subjects were troubled by symptoms, and the emotional and physical symptoms were not paid enough attention, leading to the aggravation of pain perception. In addition, most of the interviewees said that there was a lack of communication between doctors and patients, which was related to the lack of attention of healthcare professionals to pain during chemotherapy, the lack of systematic and effective pain management measures and the difficulty of patients to express their needs (because of habitual patience or do not know how to express, etc).

The assessment and identification of pain by healthcare professionals may be different from the actual pain experienced by patients. Triangular detection method is more effective in identifying chemotherapy-related pain in patients with breast cancer than a single assessment tool. It is necessary to use complementary research tools in practice to accurately screen pain. In addition, given the subjective nature of pain, we need to pay attention to the patient’s chief issue. Therefore, it is necessary to pay attention to the early identification and intervention of pain in patients with breast cancer during chemotherapy, pay attention to the physical and mental symptoms of patients and provide timely counselling.

Early and continuous information support
Correct cognition is the basis of pain management. Most interviewees lack pain-related knowledge, and some have misunderstandings about current pain management, resulting in failure to actively cooperate with analgesic treatment and affecting the effect of pain management. From the ways of obtaining information, patients were more willing to share information with their patients. Studies have shown that peer support can significantly improve the negative emotions of patients with breast cancer and greatly affect the stress management of patients. However, the effects of different types of peer support have not been unanimously recognised, and the practical application still needs to be cautious. Healthcare professionals are the main objects for patients to obtain scientific information. The researchers learnt that healthcare professionals do not pay enough attention to patients’ pain expression, and the deviation of pain cognition between doctors and patients affects patients’ desire to express, leading to poor pain management effect. Some interviewees said that they did not know the pain symptoms in advance before chemotherapy, resulting in insufficient psychological preparation, or the actual pain was beyond expectations despite understanding, which aggravated the pain intensity to a certain extent. Pain during chemotherapy for breast cancer is affected by multidimensional factors. Early assessment of psychological distress and pain anticipation is helpful to improve prognosis and predict adverse postoperative pain trajectory. Healthcare professionals can provide knowledge education before chemotherapy to help patients carry out relevant psychological construction. The interviewees all have different degrees of pain catastrophising thoughts. Pain-related fear may stimulate avoidance behaviours, leading to adverse consequences such as chronic pain or disability. Systematic short-term pain education (10–15 min per day) can improve the pain experience of patients with cancer more effectively than conventional health guidance. By means of chemotherapy, healthcare professionals can provide patients with continuous pain personalised guidance during hospitalisation to avoid adverse outcomes caused by missing information and catastrophising emotions.
Support and guide good coping style
Coping style refers to the cognitive behaviour of individuals in stressful situations, which plays an important role in the treatment and rehabilitation of diseases and greatly affects the physical and mental status and quality of life of patients. Most of the interviewees in this study received adjuvant chemotherapy after radical surgery, suffered from multiple symptoms with pain as the core, had pain catastrophising thoughts, and most of them adopted an avoidance coping style when pain occurred. Based on the pain fear avoidance model,19 avoidance may lead to the maintenance or aggravation of fear or even the generation of a fear state. Some interviewees were influenced by past pain experiences, leading to excessive emphasis on current pain experience, which may cause amplification of actual pain intensity. This may be related to the differences in individual preference for symptom attention, and the priority items may affect the pain experience.19 All the interviewees in this study reported that their pain experience was troubled by negative emotions, and long-term accumulation led to negative coping styles. We need to pay attention to the special significance of neurophysiological factors in pain management, especially adverse emotions such as depression and anxiety, which may be related to increased pain sensitivity.20 Some of the interviewees felt lonely and distressed when the pain occurred, and believed that it was difficult for others to empathise with the pain they experienced, and they were powerless in the face of the occurrence of pain. The persistent pain experience related to chemotherapy can easily cause insecurity in female patients with breast cancer and affect their coping style.21 Positive coping strategies can effectively improve patients’ quality of life and psychosocial adaptation to the disease.22 Therefore, we should pay attention to assess the coping style of patients with breast cancer during chemotherapy, help them face up to the adverse pain experience in the process of disease treatment and guide them to adopt positive and effective coping styles according to their personal characteristics.

Strengths and limitations
An important strength of this study is that the data in this study were obtained from clinical patients with breast cancer undergoing chemotherapy, allowing readers to understand the real pain experience of such patients during chemotherapy. In addition, this study is a qualitative research method, and this research design is helpful to collect the detailed feelings and experiences of pain of patients with breast cancer during chemotherapy. But as is common in qualitative studies, we used a relatively small sample of interviewees. In larger-scale studies, the results could be further validated. And this study is a single-centre study, and the selection of research objects needs to be further expanded in the future. Meanwhile, the single interview time is too long, and each interview time is 40–60 min, which leads to the decrease of the patience of the interview subjects and the quality of the interview may be affected to a certain extent.

CONCLUSIONS
Through an interview with 11 patients with breast cancer during chemotherapy, interviewees often experienced severe pain during chemotherapy and pain catastrophising thoughts were closely related to their pain perception and experience. In this paper, five themes were extracted, including physical memory of pain, special meaning of time, disease treatment and prognosis, interpersonal communication and coping and personal behaviour and growth. It should be pointed out that each theme is not completely independent, and sometimes affects each other, which fully reflects the contradiction and complexity of the pain experience of the interviewees. It is necessary to pay more attention to the pain of patients with breast cancer during chemotherapy, especially the mental and psychological aspects, and be alert to the adverse physical and mental consequences caused by pain catastrophising thoughts.

Contributors
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Data availability statement
Data sharing not applicable as no data sets generated and/or analysed for this study. This is a qualitative in-depth interview based study. As such, there is no dataset to share. The only raw data available are audio records of interviews and verbatim transcripts. While de-identified transcripts can be shared, audio-records cannot.

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