

## RESEARCH ARTICLE

# Dance Healing Improves Recovery Beliefs in Patients with Cancer-Related Fatigue

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## ABSTRACT

Cancer-related fatigue significantly impairs the quality of life of cancer survivors, and while Dance Healing has gained recognition as a complementary intervention, it remains underexplored in depth. Grounded in psychosocial theories, including social support theory, self-efficacy theory, and expectancy theory, in combination with Dance Healing principles, this study investigates its role in enhancing recovery beliefs among cancer-related fatigue survivors. Using in-depth interviews with 150 participants from three leading medical institutions in China and qualitative analysis via NVivo 14, the research coded responses around self-motivation, social support, and outcome expectations. Findings indicate that self-motivation was primarily fostered by observed physical and psychological improvements. Social support was shaped through professional guidance, family encouragement, and peer interactions. Collectively, participants anticipated that Dance Healing would enhance their physical, psychological, and social functioning. As a complementary approach, Dance Healing effectively addressed holistic needs, integrated multidimensional support, and fulfilled recovery expectations, thereby enhancing recovery outcomes, quality of life, and strengthening overall recovery beliefs.

**Keywords:** Dance Healing; cancer-related fatigue; social support theory; social psychology; recovery beliefs; qualitative research

## 1. Introduction

Cancer-Related Fatigue (CRF) is one of the most common and most disturbing symptoms in cancer patients<sup>[1]</sup>. It is a persistent, subjective feeling of fatigue related to cancer or cancer treatment, often accompanied by functional impairment<sup>[2],[3]</sup>. A meta-analysis showed that the total incidence of CRF in cancer patients was approximately 70.7% (95% CI: 60.6%–83.8%)<sup>[4]</sup>. CRF is characterized by long-term, persistent, and subjective symptoms, which cause multi-dimensional impairments in patients' physical, emotional, or cognitive functions, seriously affecting their quality of life and belief in recovery<sup>[3]</sup>. Related

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evidence indicates that during chemotherapy, up to 90% of patients report a decline in quality of life, and 30–40% continue to experience persistent fatigue even several years after treatment<sup>[5]</sup>.

The pathogenesis of CRF is complex and has not yet been fully clarified, resulting in many challenges in its treatment<sup>[1,4]</sup>. Modern medicine currently has no specific drugs and mainly relies on non-drug interventions, including exercise therapy, psychological intervention, nutritional support, etc<sup>[6]</sup>. However, these methods also have the phenomenon of low patient compliance<sup>[6],[7]</sup>. Research indicates that cancer-related fatigue significantly impairs survivors' social functioning, vocational capacity, and increases their healthcare burden<sup>[8]</sup>. Thus, it is not merely an individual health issue; the associated caregiving demands and productivity loss also pose ongoing challenges to both family resources and broader societal support systems, establishing it as a critical public health concern. Given this, there is an urgent need to explore innovative interventions that can effectively facilitate the reintegration of cancer-related fatigue survivors into society.

**Cancer-related fatigue (CRF)** has a profound impact not only on patients' quality of life but also on their social functioning. Beyond the physical depletion of energy and cognitive sluggishness, CRF disrupts the continuity of social roles (e.g., as parents, employees, or partners), often leading to a crisis of social identity. Bower et al. demonstrated that patients with CRF experience significant limitations in social participation, occupational functioning, and the maintenance of intimate relationships<sup>[9]</sup>. Studies of breast and colorectal cancer survivors further revealed that individuals with CRF scored significantly higher on the Social Difficulties Inventory (SDI-21) across all dimensions, and their likelihood of unemployment or taking sick leave was approximately 2.7 times greater than those without fatigue (*The Association of Cancer-Related Fatigue on the Social, Vocational and Healthcare-Related Dimensions of Cancer Survivorship*). These findings suggest that CRF is not merely a symptom at the individual level but a substantial barrier to social participation and functional recovery<sup>[8]</sup>.

Persistent fatigue also places considerable strain on caregivers, who often experience “secondary fatigue” due to the emotional burden and financial stress associated with caregiving. This dynamic can diminish patients' motivation for recovery and perpetuate a negative emotional feedback loop <sup>[10],[11],[12]</sup>. In addition, chronic fatigue frequently leads to social withdrawal and isolation, while societal misunderstanding and stigmatization—such as being labeled “lazy” or “negative”—further exacerbate feelings of loneliness and self-blame<sup>[13]</sup>.

From a social-psychological perspective, the development and maintenance of CRF can be interpreted through three theoretical frameworks. According to Self-Efficacy Theory an individual's belief in their ability to regulate behavior directly influences engagement in recovery activities. When patients lose confidence in their capacity to improve, they are prone to learned helplessness, leading to avoidance of exercise and rehabilitation.<sup>[14]</sup> Expectancy Theory posits that motivation depends on three cognitive factors—expectancy, instrumentality, and valence. If patients perceive little connection between effort and outcome or assign low value to recovery, they may enter a self-perpetuating cycle of *low expectancy–low motivation–inactivity–persistent fatigue*<sup>[15]</sup>. Finally, Social Support Theory suggests that emotional and instrumental support can buffer stress, reduce cortisol levels, and enhance immune functioning, thereby protecting against emotional dysregulation and prolonged fatigue<sup>[16]</sup>. However, CRF often reduces social engagement, weakens support networks, and impairs emotional adjustment<sup>[33]</sup>. In sum, the psychosocial mechanism of CRF reflects an interactive dysregulation among diminished self-efficacy, motivational imbalance, and weakened social support. Effective interventions should aim to rebuild patients' sense of control, strengthen recovery expectancy, and reactivate social support systems, thereby facilitating a shift

from *passive exhaustion* to *active resilience* and restoring the integration of physical, psychological, and social functioning.

In recent years, Dance Healing has gradually gained attention and recognition in various fields of cancer rehabilitation as a complementary alternative therapy<sup>[17], [18]</sup>. It is an expressive art therapy method that uses dance or movement processes to promote individual emotions, body cognition and social integration<sup>[19]</sup>. Through the display of body movements, postures and expressions in Dance Healing, it is possible to deeply explore the inner world and enhance the self-identity and self-confidence of cancer fatigue survivors<sup>[20], [21], [22]</sup>. Group Dance Healing can also improve interpersonal communication skills<sup>[23]</sup>. At the same time, the therapeutic process is also characterized by whole-body participation, rhythmicity, emotional expression and social interaction<sup>[24]</sup>. These characteristics enable Dance Healing to not only assist in improving and enhancing the physiological functions of cancer fatigue survivors, but also promote their mental health and social adaptation, and effectively improve cancer fatigue, emotional state and quality of life<sup>[25]</sup>.

Although Dance Healing has a positive effect on assisting and enhancing the recovery beliefs of CRF survivors<sup>[24]</sup>, related research still lacks a deep understanding of the self-motivation, social support and outcome expectations of CRF survivors participating in Dance Healing through qualitative research. Assuming that we believe CRF survivors can enhance their rehabilitation beliefs by participating in Dance Healing, this study will, based on the theories of art therapy, self-efficacy, social support, and expectancy, delve into the following three core issues: (1) the self-motivation of CRF survivors to participate in Dance Healing; (2) the impact of social support on CRF survivors' participation in Dance Healing; and (3) the expectations of CRF survivors for the results of continuing to participate in Dance Healing. This study can enrich the theoretical system of cancer fatigue rehabilitation and expand the application theory of art therapy in cancer rehabilitation. At the same time, it can provide clinical medical staff with a new and effective intervention method for cancer fatigue, improve rehabilitation effects, and improve the quality of life of CRF survivors.

## 2. Materials and methods

### 2.1. Participants

The Radiation Oncology Center of West China Hospital, Sichuan University, the Rehabilitation and Nursing Center of Sichuan Provincial Cancer Hospital, and the Affiliated Hospital of Chengdu University are all leading cancer treatment and rehabilitation nursing institutions in China, each serving nearly 100,000 patients annually. For this study, through recommendations from Professor Li of the Radiation Oncology Center of West China Hospital, Sichuan University, Professor Tian of the Rehabilitation and Nursing Center of Sichuan Provincial Cancer Hospital, and Professor Yang of the Affiliated Hospital of Chengdu University, we identified and interviewed 150 CRF survivors from the cancer rehabilitation centers of these three medical institutions in Chengdu, China.

**Table 1** below shows the inclusion criteria for these 150 participants: survivors of breast, colorectal, prostate, gastric, liver, and uterine cancer, aged between 22 and 75 years. They came from 20 different provinces in China, as well as from Zambia and Uganda in Africa, and from Russia, Bulgaria, and France in Europe. All had completed their primary treatment and had participated in Dance Healing for at least one year.

**Table 1.** Basic Characteristics of 150 Respondents

Characteristic	Category	n (%)
Ethnicity	Black	4 (2.67)
	White	3 (2.00)
	Asian	143 (95.33)
Region of Origin	Chengdu, China	59 (39.33)
	Other provinces in China	84 (56.00)
	Europe	3 (2.00)
	Africa	4 (2.67)
	Male	61 (40.66)
Gender	Female	89 (59.34)
	Breast cancer	46 (30.66)
Type of Cancer	Colorectal cancer	23 (15.34)
	Prostate cancer	39 (26.00)
	Gastric cancer	22 (14.66)
	Liver cancer	4 (2.67)
	Uterine cancer	16 (10.67)
	Doctoral degree	5 (3.33)
	Master's degree	12 (8.00)
Educational Level	Bachelor's degree	75 (50.00)
	Associate degree	58 (38.67)
	Full-time	34 (22.66)
Current Employment Status	Part-time	16 (10.67)
	Retired	73 (48.66)
	Unemployed	4 (2.67)
	Homemaker	11 (7.34)
	Student	12 (8.00)
Duration of Dance Healing	One year	57 (38.00)
	One to two years	52 (34.66)
	Three years or more	41 (27.34)

*Note.* Percentages are based on the total number of respondents ( $N = 150$ ).

These 150 eligible survivors were recruited by telephone through the patient databases of the Radiation Oncology Center of West China Hospital, Sichuan University, the Rehabilitation Nursing Center of Sichuan Cancer Hospital, and the Affiliated Hospital of Chengdu University. Of them, 57 have been participating in Dance Healing for one year, 52 for one to two years, and 41 for three years or more. All of them took part in Dance Healing three times a week, with each session lasting 90 minutes. The forms of Dance Healing included listening to music while perceiving one's body through meditation; moving freely to the music and feeling control over one's body; dancing expressively to the rhythm of the music while breathing, experiencing a sense of relaxation; and singing along to the music while dancing, feeling the release of pressure.

To ensure that these 150 participants understood and trusted the study and felt comfortable participating voluntarily, three professors from each of these three medical institutions provided phone calls to introduce the research team, the study's objectives, and how participants would participate.

## **2.2. Data collection and analysis**

After signing written informed consent, each of the 150 participants underwent an in-depth interview (120 minutes per interview). The interviews took place over 75 days. Our research team worked an average of 240 minutes per day, interviewing two participants each day. During each interview, a professor with extensive expertise in qualitative research methods served as the facilitator, while two research team members provided support. The discussions were conducted as open-ended dialogues, guided by a carefully designed semi-structured interview protocol. The guide included 15 open-ended questions addressing personal motivations for participating in Dance Healing, social support, and outcome expectations (e.g., "Why did you choose to participate in Dance Healing? How do you feel Dance Healing has impacted you physically and mentally? What are the attitudes of your attending physician, family, and friends towards your participation in Dance Healing? What are your thoughts on your recovery prospects after participating in Dance Healing? Will you continue to participate in Dance Healing in the future? Why?"). These questions were designed to guide the discussion, but the trained and experienced moderators minimized presumptions and fostered a relaxed and engaging atmosphere through participants sharing their own experiences with dance, encouraging participants to express their opinions candidly. To encourage participants, we provided each participant with a 100 RMB gift card as compensation after completing the interview. Interviews continued until information saturation was achieved. The complete interview outline is attached. Of particular note, to protect participant privacy, only the last name of the participant will be used in this article, and their first name will be withheld, after the participant fully understood the purpose of the study and the requirements of the academic publication and signed a written informed consent form. This study was approved by the Clinical Trial Ethics Committee of the Affiliated Hospital of Chengdu University, China (PJ2024-105-06) and the Academic Ethics Committee of Chengdu University, China (CDSK20250326).

This study employed semi-structured interviews<sup>[26]</sup>. The interview guide was developed based on a systematic review of literature concerning social support<sup>[33]</sup>, self-efficacy<sup>[34]</sup>, and expectancy theory<sup>[15]</sup>. Content validity was reviewed by two experts in dance healing and oncology rehabilitation, leading to revisions in question phrasing to effectively elicit core research themes. Following pilot interviews, the openness and guidance of the questions were further refined.

Data analysis strictly followed the thematic analysis procedures outlined by Braun and Clarke<sup>[27]</sup>, assisted by NVivo 14 software<sup>[28]</sup>. Initially, two researchers independently read and re-read all interview transcripts and performed initial coding. Through repeated discussions, similar codes were grouped into sub-themes (e.g., "sense of physical mastery," "emotional catharsis"). Finally, in team meetings involving all authors, sub-themes were mapped and integrated with the research questions, culminating in three core themes: "self-motivation," "social support," and "outcome expectations." The inter-coder agreement (Kappa) between the two researchers was 0.89, with minor coding discrepancies resolved through consensus discussions.

To ensure research rigor, member checking (where preliminary findings were shared with selected participants for validation) and triangulation (involving researchers from diverse backgrounds in the analysis process) were adopted, thereby enhancing the credibility and interpretative strength of the study findings.

### **3. Results**

#### **3.1. Self-motivation for participating in dance healing to enhance recovery beliefs**

Through analysis of interview data, we found that the self-motivation for participating in Dance Healing to enhance recovery beliefs among patients recovering from cancer-related fatigue primarily includes the following aspects:

##### **3.1.1. Self-motivation driven by physical recovery needs**

Of the 150 respondents, 138 (92%) stated that their primary motivation for participating in Dance Healing was to improve physical function, alleviate CRF symptoms, and strengthen their belief in recovery. Ms. Zhang, a retired female breast cancer survivor from Chengdu, China, shared: "After chemotherapy, I felt very weak all over and could barely walk. But I wanted to survive and I needed to have a strong belief in recovery, so my doctor recommended Dance Healing, saying it would help me regain my strength." Mr. Mulenga, another colorectal cancer survivor from Zambia, said: "My abdominal muscles became very weak after surgery. I'm still an international student and I'm still young. I hope to live a better life. I loved dancing when I was in Africa, and I know that through Dance Healing, I can gradually regain my abdominal strength." Dance Healing can also effectively improve participants' cardiopulmonary function, muscle strength, joint mobility, and body coordination, and it also provides motivation for survivors to strengthen their belief in recovery <sup>[29]</sup>. As Mr. Li, a prostate cancer survivor from Henan Province, China, shared his motivation for participating in Dance Healing: "After chemotherapy, I felt it was difficult to even climb the stairs. I've always loved dancing, and I know that Dance Healing can help me better regain muscle strength and joint flexibility."

##### **3.1.2. Self-motivation from psychological adjustment needs**

In addition to physical recovery needs, respondents also mentioned self-motivation from psychological adjustment needs. All 150 survivors stated that the cancer diagnosis and treatment process brought them immense psychological stress and negative emotions, such as anxiety, depression, and fear. Ms. Wang, a female gastric cancer survivor from Guangdong Province, China, said: "After being diagnosed with cancer, I was depressed all day and had no interest in anything. After the surgery, I was also very depressed. I felt that I should have confidence in my health and believe that I could recover. I knew that Dance Healing can not only exercise the body but also cheer up the mood, so I chose Dance Healing." Another liver cancer survivor from Russia, Ms. Kuznetsova, also said: "I have loved dancing since I was a child. Whenever I dance to the music, all my worries are thrown behind my mind. I feel unprecedented ease and happiness. So, I believe that participating in Dance Healing can speed up my physical recovery and establish a belief in recovery." Through the oral accounts of the above interviewees, it can be seen that Dance Healing, through the combination of music and physical movement, can provide a channel for the survivors who participate in Dance Healing to release emotions and stress<sup>[30],[31]</sup>.

#### **3.2. Social support from physicians, family, and friends**

CRF survivors have suffered significant physical and mental damage due to the pain of illness, the pain of surgery and treatment, and the physical and psychological stress<sup>[32]</sup>. Therefore, they desperately need social support from their physicians, family, and friends to help strengthen their confidence in recovery. This finding corroborates the observation by social psychologists Cohen and Wills that social support, as a critical social-environmental factor, helps individuals navigate the specific demands arising from stressful events<sup>[33]</sup>.

### **3.2.1. Support from physicians**

Most respondents mentioned that their physicians' advice was a key motivation for participating in Dance Healing. Because survivors have a high level of trust in their physicians, they actively respond to their physicians' advice. Ms. Mwanje, a female breast cancer survivor from Uganda, shared: "My primary doctor told me that Dance Healing can help relieve cancer-related fatigue and recommended it. I trust my doctor and believe that Dance Healing can boost my confidence in recovery, so I signed up." Mr. Zheng, a colorectal cancer survivor from Chengdu, China, said: "The doctor said Dance Healing can help me regain my strength and improve my immunity. It can also bring me joy through artistic appreciation, strengthen my confidence in life, and enhance my faith in recovery. I thought it made sense, so I decided to give it a try."

Based on the oral experiences of 150 respondents, we found that the support of primary doctors is the most important factor for survivors of cancer-related fatigue to participate in Dance Healing. This support is mainly reflected in professional advice (providing professional knowledge and suggestions about Dance Healing), confidence support (affirming the effectiveness of Dance Healing and boosting the survivor's confidence), and resource recommendations (recommending suitable Dance Healing institutions and courses). As Mr. Liu, a prostate cancer survivor from Gansu Province, China, said: "I trust my attending doctor's advice the most, he not only recommended that I take up Dance Healing but also helped me get in touch with a professional rehabilitation training institution, which has made me feel really reassured."

### **3.2.2. Support from family**

Family support is also crucial for those experiencing cancer-related fatigue to participate in Dance Healing and strengthen their faith in recovery. All 150 survivors stated that their family's understanding, encouragement, and companionship were crucial in their persistence in Dance Healing and strengthening their faith in recovery. Ms. Sun, a stomach cancer survivor from Guizhou Province, China, shared: "Surgery and chemotherapy left me physically and mentally exhausted. I almost lost the courage to live. But my husband always encouraged me. He told me to follow the doctor's advice and join Dance Healing, saying I would definitely recover. He always accompanied me to Dance Healing and cheered me up." Ms. Qi, a liver cancer survivor from Chengdu, China, added: "My daughter not only supports my Dance Healing but also signed up for a parent-child dance class with me. She always drives me to training and dances with me, which gives me even more confidence in my recovery."

The interviewees' accounts show that emotional support from family members, including understanding, encouragement, and care, as well as practical assistance with transportation and time, and companionship, such as accompanying them to training and participating in activities, are crucial spiritual support and safeguards for those experiencing cancer-related fatigue in participating in Dance Healing to enhance their recovery beliefs.

### **3.2.3. Support from friends**

Support from friends is also a key driver for those experiencing cancer-related fatigue in participating in Dance Healing to enhance their recovery beliefs. Many participants expressed a sense of warmth and support from their friends' encouragement and companionship. Dobрева, a breast cancer survivor from Bulgaria, shared, "I was studying abroad in Chengdu, China. My classmates and friends were very worried about me when they learned I had breast cancer. When they heard I would be participating in Dance Healing as part of my post-operative recovery, several of my close female friends offered to accompany me. Now, they drive me to training each week and encourage and motivate me to persevere and believe that I can recover." During the interviews, we found that as CRF survivors participated in Dance Healing to enhance their recovery beliefs, the support from their friends was primarily manifested in: social motivation, encouraging

participation in social activities; companionship, providing support by accompanying or participating in training together; and information sharing, providing information and experiences about Dance Healing. As Mr. Ke, a colorectal cancer survivor from Chongqing, China, said: "During my hospitalization, I met several friends with the same condition. We now participate in Dance Healing together. We have also formed a dance team for cancer survivors. We train together every week and actively share our training experiences and feelings, encouraging each other to maintain our faith in recovery."

From the oral accounts of the above-mentioned interviewees, it can be seen that the combined effect of multiple social supports is positive and effective in promoting the recovery faith of CRF survivors through Dance Healing. When the attending physician, family, and friends all support the survivors' participation in Dance Healing, the survivors' enthusiasm and persistence in participating are higher<sup>[15] [34]</sup>. As Ms. Qin, a liver cancer survivor from Shaanxi Province, China, said: "The support from my attending physician, family, and friends makes me feel surrounded by love and support. This feeling fills me with strength. I believe I can overcome cancer and recover."

### **3.3. Expectation of outcomes of continued dance healing to enhance recovery faith**

Expectation of outcomes is an important motivation for cancer-related fatigue survivors to participate in and persist in Dance Healing to help enhance their recovery faith. During the interviews, all respondents expressed their determination to continue Dance Healing and their belief that consistent Dance Healing would help them improve their recovery more effectively and more quickly. This focus included the following aspects.

#### **3.3.1. Expectations for the impact of continued dance healing on their physical recovery**

Most respondents expressed that due to prolonged bed rest following surgery, they were physically and mentally exhausted. They hoped to enhance their physical strength, improve muscle strength, increase flexibility, and boost their immunity through Dance Healing, a pleasurable form of exercise. They also expressed their continued participation in Dance Healing to further improve their physical function and alleviate CRF symptoms. Ms. Hu, a breast cancer survivor from Chengdu, China, said, "After participating in Dance Healing, I feel a significant return to my physical strength. We combine breathing exercises with movement training, and I clearly feel more in control of my body. Therefore, I hope to continue training to become stronger and strengthen my faith in recovery." Mr. Fan, a colorectal cancer survivor from Qinghai Province, China, also stated, "Dance Healing has been very helpful in my postoperative recovery. During training, we sing and dance to carefully choreographed movements. Afterward, I feel incredibly strong. I plan to continue with Dance Healing, even after I've fully recovered. It has improved my flexibility, brought me a sense of well-being, and filled me with confidence every day about my future."

#### **3.3.2. Expectations of continuing dance healing for improved mental health**

During the interviews, the respondents also expressed the immense psychological pain caused by illness, surgery, chemotherapy, and radiotherapy. All 150 respondents stated that Dance Healing has had a positive impact on their emotional and mental health, particularly strengthening their faith in recovery. During the interview, the interviewees all expressed their hope to continue to participate in Dance Healing to further improve their mental state. Ms. Sui, a gastric cancer survivor from Hubei Province, China, said: "Dance Healing is different from other exercise therapy and art therapy. Dance Healing has a very good comprehensive therapeutic effect. Our Dance Healing is very well designed. First, you can feel your body by meditating while listening to music. Then, by combining the artistic conception of the music, you can combine breathing and movement to exercise your body and express your mood in Dance Healing. After the training, I feel that my body has achieved the purpose of exercise therapy through Dance Healing. What



makes me even happier is that I have expressed and pleased my mood in the aesthetics and feelings of art. Dance Healing has made me more optimistic and positive. I hope to continue training and maintain this good mentality." Similarly, Mr. Han, another liver cancer survivor from Anhui Province, China, expressed a similar sentiment: "I've tried other exercise-based rehabilitation therapies, but they were too boring. I prefer Dance Healing. I sing and dance to choreographed scenarios, aligning my body and mind. This type of training not only exercises my body but also allows me to engage in artistic appreciation and relax. I hope that by continuing to participate in Dance Healing, I can completely overcome the psychological trauma of cancer and regain my happiness and confidence." Another uterine cancer survivor, Ms. Wei from Jiangxi Province, China, confidently stated, "Dance Healing has taught me to listen to music and meditate while feeling my body. Then, by moving my body to the music, I can express and regulate my emotions. I hope to continue participating in Dance Healing so that I can become more in control of my emotions."

### **3.3.3. Expectations of improved social functioning through continued dance healing**

In addition to the aforementioned expectations regarding physical rehabilitation and improved mental health, many respondents also expressed positive expectations for improved social functioning through Dance Healing. Ms. Bernard, a breast cancer survivor from France, said, "During Dance Healing, we danced in a circle and paid attention to each other. I met many like-minded friends. I hope to continue training to expand my social circle and make my life more colorful." Mr. Lei, a prostate cancer survivor from Sichuan Province, China, also expressed the same expectation: "I will continue Dance Healing to show the charm of cancer survivors to the society, eliminate prejudice and discrimination against cancer patients, and promote my confidence in participating in social activities in the future." The above interviewees' oral statements show that they hope to expand their social circle, enhance social support, improve their quality of life, and promote their continued improvement in recovery beliefs by continuing to participate in Dance Healing.

## **4. Discussion**

### **4.1. The impact mechanism of dance healing on recovery beliefs**

The results of the above qualitative study show that Dance Healing can enhance the recovery beliefs of CRF survivors through the integration of mind and body. At the same time, this finding is consistent with Dance Healing theory and self-efficacy theory<sup>[35],[36]</sup>.

From the perspective of Dance Healing theory, we can see that Dance Healing, as a form of expressive art therapy, provides a channel for emotional expression for patients through the combination of music and body movement. The use of a combination of body movement and emotional expression can help patients release negative emotions and enhance their self-identity and belief in recovery<sup>[37]</sup>. This is consistent with the core concept of Dance Healing theory, *i.e.*, the mutual connection between body and mind, and that body movement can reflect and influence the psychological state<sup>[38]</sup>.

Dance Healing enhances the self-efficacy of patients by providing enactive mastery experience, vicarious experience and social persuasion, and better assisting CRF patients to improve their recovery beliefs. This is also consistent with self-efficacy theory. By completing a series of Dance Healing movements in the combination of music and body art, patients can fully experience the ability and value of the body, thereby enhancing their confidence in their own recovery ability<sup>[24],[29]</sup>. As Ms. Qiao, a gastric cancer survivor from Hunan Province, China, said, "When I dance to the music, all my worries and fatigue flow away with my sweat, and I feel a sense of relief I've never felt before. At the same time, when I can complete a complex dance move, I feel I'm still capable, which gives me confidence in my recovery." This sense of accomplishment and self-efficacy further strengthens the survivors' belief in recovery<sup>[39]</sup>, validating

the Dance Healing that the mind and body are an inseparable unity. According to this theory, emotions, thoughts, psychological conflicts, and inner energy are all expressed through one's posture, muscle tension, respiratory rhythm, and movement patterns.

Furthermore, our study also found that social support from attending physicians, family, and friends has a significant impact on the enthusiasm and recovery beliefs of CRF survivors participating in Dance Healing, which is consistent with social support theory. From the perspective of social support theory, social support can provide information and resources to help survivors make decisions about participation; it can enhance survivors' confidence in the effectiveness of Dance Healing, increasing their confidence and motivation to participate; it can reduce survivors' psychological stress and negative emotions, improving their mental health; and it can provide supervision and encouragement to promote survivors' persistence in Dance Healing and help them maintain their behavior<sup>[40],[41],[42]</sup>. These cases align with the postulation in social psychology that through social support, individuals obtain various forms of assistance, which can help them cope with stress, enhance well-being, and improve overall health<sup>[43]</sup>.

The respondents' positive expectations of continuing to participate in Dance Healing were closely related to their participation and recovery beliefs, consistent with expectancy theory. When individuals anticipate that a behavior will lead to positive outcomes, they are more likely to engage in that behavior. In this study, the positive outcome expectations of Dance Healing (e.g., improved physical function, improved mental health, and improved social function) motivated them to continue participating in Dance Healing and strengthened their recovery beliefs<sup>[29]</sup>. As Mr. Bao, a prostate cancer survivor from Sichuan Province, China, said in the interview: "Dance Healing has made me more physically coordinated, more cheerful, and I have made many like-minded friends. I hope that by continuing to participate in Dance Healing, I can enhance my recovery beliefs." This positive expectation of outcomes strengthened his motivation to participate and his recovery beliefs, consistent with expectancy theory, which states that an individual's behavior depends on his or her expectations and evaluations of the outcomes of his or her behavior<sup>[44]</sup>.

## **4.2. Clinical significance**

Our study found that using Dance Healing to help CRF survivors improve their recovery beliefs has positive clinical significance.

The results of this study indicate that Dance Healing can effectively enhance the recovery beliefs of CRF survivors and improve their quality of life. Clinicians may consider Dance Healing as an adjunctive intervention for cancer-related fatigue and recommend it to appropriate patients. Meanwhile, research results demonstrate that social support from primary care physicians, family, and friends significantly influences patients' motivation to participate in Dance Healing and their belief in recovery. Clinicians should prioritize the role of diverse social support and encourage family and friends to participate and form a support network. Furthermore, through interviewees' verbal responses, we found that patients' motivations for participating in Dance Healing and their expectations for outcomes vary. Clinicians should address patients' individual needs and expectations and provide personalized rehabilitation plans and guidance. Clinicians may also consider combining Dance Healing with other rehabilitation therapies (such as physical therapy and psychotherapy) to enhance rehabilitation outcomes.

## **4.3. Study limitations**

Although our study yielded some significant findings, the sample size was primarily based on three medical institutions in Chengdu, China. Despite the 150 participants surveyed, representing 20 provinces in China and multiple countries, the sample's regional representativeness is limited. Additionally, the sample had a higher proportion of female participants (59.34%) and uneven distribution of cancer types (breast

cancer accounted for 30.66%), which may affect the generalizability of the study results. Future research should expand the sample size to include more regions and different types of cancer survivors to enhance the representativeness and generalizability of the findings.

## 5. Conclusion

This study, based on in-depth interviews with 150 CRF survivors from three medical institutions in Chengdu, China, explored the effects of Dance Healing on their recovery beliefs. The study found that Dance Healing promoted self-identification of recovery beliefs through a mind-body integration approach. Social support from attending physicians, family, and friends increased participants' motivation to participate in Dance Healing. The findings demonstrate that this study directly addresses the significant public health issue of cancer-related fatigue, providing empirical evidence that Dance Healing effectively enhances survivors' rehabilitation beliefs and quality of life. As an effective complementary intervention, Dance Healing helps strengthen rehabilitation beliefs, improve quality of life, cultivate intrinsic confidence, and facilitate the reintegration into normal social functioning for cancer-related fatigue survivors. This research not only offers an innovative non-pharmacological intervention for clinical practice and alleviates caregiving burdens on families and society, but also promotes the integration of patients' physical, psychological, and social functioning. By doing so, it provides an effective pathway for social reintegration, responding at the individual level to broader societal expectations<sup>[33,41,45]</sup>. Future research should further investigate the therapeutic mechanisms of Dance Healing, optimize intervention protocols, and facilitate its broader implementation in clinical practice.

## Conflict of interest

The authors declare no conflict of interest

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## **Appendix: Interview Outline**

1.Under what circumstances did you initially decide to try Dance Healing to alleviate cancer-related fatigue? What specific thoughts or expectations did you have at that time?

2.During your participation in Dance Healing, what physical changes (such as changes in stamina, pain, or fatigue) have made you more confident in your recovery?

3.Beyond physical sensations, what experiences during Dance Healing have made you feel mentally stronger in facing the illness?

4.When your attending doctor recommended or talked about Dance Healing, what specific things did they say that made you willing to try it? How did these suggestions affect your belief in recovery?

5.How have your family members' attitudes or behaviors changed before and after you started Dance Healing? How did these changes influence your determination to persist with the training?

6.What feedback did your friends or colleagues give when they learned you were participating in Dance Healing? Did this feedback strengthen your expectations for recovery?

7.When participating in Dance Healing with other survivors, did you feel supported? What special significance does this peer interaction hold for your belief in recovery?

8.When you felt tired or wanted to give up Dance Healing, what supported you to continue? How is this related to your confidence in recovery?

9. Compared with other rehabilitation methods (such as medication or regular exercise), what unique features does Dance Healing have in enhancing your belief in recovery?

10. Has your understanding of "recovery" changed after participating in Dance Healing? What specific differences are there?

11. How long have you been participating in Dance Healing? How many times a week do you train, and how long is each session?

12. What forms does the Dance Healing take? What dance movements are involved? Please describe them briefly.

13. When you complete a new movement or keep up with the rhythm during Dance Healing, how do you feel? How does this affect your perception of your own recovery ability?

14. Would you actively recommend Dance Healing to other cancer-related fatigue patients? When recommending, what roles would you emphasize regarding its ability to enhance recovery beliefs?

15. Will you continue to participate in Dance Healing? If yes, what goals do you expect to achieve in terms of your physical, mental, or life status through long-term training? How do these goals reflect the enhancement of your recovery beliefs?