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Original Article

Managing cancer and living meaningfully (CALM) as an intervention for severe fatigue in gastrointestinal cancer survivors

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Abstract: This study aimed to evaluate the effectiveness and feasibility of CALM (managing cancer and living meaningfully), which is a psychotherapeutic intervention used to reduce cancer-related fatigue (CRF) and improve quality of life (QOL) in Chinese gastrointestinal cancer survivors (GCs). A total of 115 GCs were enrolled in this study. All patients were randomly assigned to either the CALM group or the usual care (UC) group. All patients were evaluated using the Piper Fatigue Scale (PFS) and Quality of Life Assessment Scale before and after 2, 4, and 6 CALM or UC sessions with GCs presenting with severe fatigue. We compared the differences in these scores between the CALM group and the UC group and analyzed the correlations between CRF and QOL scores. Compared with the UC group, the CALM group showed significant differences in total CRF, behavioral/daily life CRF, emotional/affective CRF, sensory/physical CRF, cognitive CRF and QOL scores before and after 2, 4, and 6 CALM sessions ($F=3106.434$, $F=1113.831$, $F=1159.919$, $F=1502.266$, $F=820.275$, $F=606.513$, respectively; $P<0.001$). Finally, negative correlations were found between CRF and QOL scores in the GCs in the CALM group (before treatment: $r=-0.46$, $P=0.0002$; after 2 sessions: $r=-0.46$, $P=0.0002$; after 4 sessions: $r=-0.51$, $P<0.0001$; after 6 sessions: $r=-0.44$, $P=0.0004$). The CALM intervention effectively reduced fatigue in cancer patients and improved their QOL. This study suggests that CALM as a psychotherapeutic intervention may be an effective way to reduce CRF.

Keywords: CALM, gastrointestinal cancer, cancer-related fatigue, quality of life

Introduction

Most cancer survivors experience cancer-related fatigue (CRF) during treatment, and approximately one-third of patients continue to experience moderate to severe CRF for months or years after treatment [1-6]. CRF is defined as "a distressing, persistent, subjective feeling of fatigue or exhaustion associated with cancer or cancer treatment that is out of proportion to recent activity and significantly interferes with normal function" [3, 7-10]. The most important features of CRF are abnormal decreases in physical and mental energy and the need for more rest; however, CRF is not directly related to recent physical exertion and cannot be relieved through basic sleep or rest [5, 10-13]. Moreover, due to the lack of physical and mental energy, CRF prevents some cancer survivors from completing other treatments, such as hormones and biotherapy, after initial treatment [14]. The toxic effects of CRF negatively affect the recovery of cancer survivors by impairing their physical and psychological functions and interfering with their return to the normal activities of life, which can potentially reduce their overall survival rate [14-17]. To date, we have yet to understand the etiology of CRF [9, 18], but some studies have suggested that it is a multidimensional symptom composed of physical, psychological and emotional aspects [9, 19, 20]. Therefore, CRF should be treated from many aspects, including both drug and psychological intervention [2, 21]. To date, few studies have demonstrated that pharmacological interventions for CRF are effective [22]. However, a meta-analysis comparing CRF drugs to psychotherapy showed that psychological

interventions played a significant role in the improvement of CRF [12].

In recent years, with the transformation of medical models to biological, psychological and social multilevel multidimensional models, we have focused further attention on the mental health problems facing cancer patients. The decisive factor regulating the fatigue experience of cancer survivors is the individual's psychological state, which directly affects their quality of life. Therefore, it is important to effectively regulate the psychological state of cancer survivors [21, 23, 24]. The mental health of cancer survivors has been discussed by many scholars from the perspective of traditional psychology, and studies have shown that psychological interventions can reduce CRF and improve quality of life [21, 25].

Recently, a psychological intervention proposed by Rodin et al. [26], and entitled manage cancer and living meaningful (CALM) has been shown to be effective in the symptom management of survivors of advanced cancer. This is a new, brief, artificially controlled psychological intervention aimed at reducing psychological stress and contributing to psychological growth and development, which is believed to be achievable in this population [27]. CALM addresses four main areas: 1. Addressing issues directly related to the disease and its relationship with the health care providers responsible for the treatment; 2. Change yourself and your relationships with those closest to you; 3. Sense of meaning and purpose; 4. Courage to live and consideration for the future [28]. In trials with survivors of advanced cancer, researchers demonstrated that CALM is an effective measure that decreases depression, death-related anxiety, mental health issues and attachment security [29, 30].

Although CALM has proven to be an effective psychological intervention, no studies have demonstrated whether CALM treatment can effectively reduce CRF in cancer patients. Thus, we conducted a randomized controlled trial (RCT) to compare CALM with usual care (UC) in Chinese gastrointestinal cancer survivors (GCs) assessed for CRF. This study had the following three objectives: (1) determine the impact of the CALM intervention on CRF; (2) determine the influence of the CALM intervention on QOL; and (3) determine whether there is a particular relationship between CRF and QOL.

Materials and methods

Participants

This unblinded, parallel assignment RCT had 2 trial conditions, the CALM intervention with UC versus UC alone. Assessments were conducted at baseline, after 2 sessions, after 4 sessions and after 6 sessions.

In total, 115 GCs with severe fatigue assessed by the Piper Fatigue Scale (PFS) were enrolled in this study at the Department of Oncology of the Affiliated Second Hospital of Anhui Medical University between March 2021 and November 2021. The patients were divided into 2 groups. The CALM intervention group was composed of 61 GCs, and the UC group included 54 GCs. Assessments of CRF (the primary outcome) and QOL were conducted at baseline and after 2, 4, and 6 CALM or UC sessions.

All GCs are selected according to the following criteria: (1) Patients with gastrointestinal cancer diagnosed pathologically who had not received other psychological interventions in the past; (2) Patients with a total PFS score ≥7; (3) Patients with a Karnofsky performance status score ≥80; (4) Patients who were at least 18 years old at the time of diagnosis, had a primary school education or above, and had sufficient audiovisual abilities to complete the questionnaire tests and intervention procedures.

GCs were excluded if they met the following criteria: (1) Patients with symptomatic brain metastases; (2) Patients currently being treated for mental disorders; (3) Advanced cachexia; (4) Patients with an estimated survival time of less than 3 months.

The study was approved by the Research Ethics Committee of the Affiliated Second Hospital of Anhui Medical University, and all subjects provided informed consent.

Procedure

Gc is determined by prescreening oncology outpatient data and recruiting eligible cancer survivors at outpatient appointments. Patients were orally introduced to the experiment by oncologists, and their informed consent was obtained. The patients' ability to participate was then assessed by the researchers, and baseline measurements were taken. After recruitment, patients were randomly assigned by

statisticians to participate in the trial. To protect patient privacy, the CALM intervention was conducted in the oncology conference room. CALM was administered to patients at their convenience during hospitalization. Finally, participants were contacted by telephone at 8 months to complete a follow-up evaluation unless patients were available to participate in a face-to-face evaluation.

The design of the experiment was evaluated by experts in the research field to ensure that the experiment was feasible, practical, and scientific.

Randomization

The statistician in our group was responsible for randomization and was not involved in the conduct of the experiment. After assessing their baseline data, a computer provided by a statistician randomly assigned the participants to a group. Unknown to the researchers, the sequence was written on cards, sealed in envelopes and opened when assigned tasks.

Intervention

CALM is a short, manual, personal psychotherapeutic intervention that covers 4 main areas: dealing with issues directly related to the disease and its relationship with the health care providers responsible for the treatment; changing yourself and your relationships with those closest to you; sense of meaning and purpose; courage to live and consideration for the future [26-30].

The areas addressed and to what extent each is covered was determined by patients in each CALM session based on their current concerns and supportive care needs. Over a period of 8 months, the patients in the intervention group received up to 6 sessions of individual therapy, with each session lasting 30 minutes. Our therapists aimed to deliver a minimum of 3 sessions within 3 months, and the participants were deemed compliant with the intervention when they achieved this goal. Ideally, the patient was encouraged to complete the maximum of 6 sessions within 8 months if they were able.

CALM was delivered in the Department of Oncology, the Second Affiliated Hospital of Anhui Medical University by 3 postgraduates, 1 psychologist, and 1 oncologist, all of whom are dedicated to psychological oncology research. Before conducting the study, the clinical researchers conducted relevant training and ongoing supervision of CALM therapists. Our therapists were deemed competent to deliver CALM after 6 hours of training and 3 hands-on exercises. To ensure adherence, competency and skill development throughout the treatment process, we have weekly group steering meetings for case development and discussion. The therapists were monitored weekly, and they wrote case reports based on their conversations to ensure the therapeutic integrity of the intervention team. In addition, the overall quality of the intervention was evaluated by the senior clinician and discussed with each clinician to improve treatment outcomes.

Measures

The PFS has been validated in the Chinese population as a self-rating scale designed to assess CRF in cancer survivors [31], and covers four dimensions of fatigue: behavior/daily life (6 items), cognition (6 items), affect/emotional meaning (5 items) and feeling/body (5 items). Each item was rated on a scale from 0 to 10, with a score of 0 being “not fatigued”.

The Quality of Life Questionnaire of the European Organization for Cancer Research and Treatment (CORE-30) (EORTC QLQ-C30) (V3.0) is a cancer-specific tool that contains 30 items [32]. The EORTC QLQ-C30 includes five important functional domains -- physical, emotional, role, cognitive, and social; two projects assess global quality of life; three symptom scales assess fatigue, vomiting, and pain; and there are also six subscales to assess dyspnea, insomnia, loss of appetite, constipation, diarrhea and financial difficulties. The scale is now widely used and has been translated into more than 80 languages by translators. Its reliability and validity have been well proven in a variety of cancers, including gastrointestinal cancer [33-37]. The EORTC QLQ-C30 questionnaire consisted of two response options, a 4-point Likert scale (range =1-4) and two global 7-point scales (range =1-7), which addressed questions related to patients’ overall health and quality of life. The score was calculated according to the instrument guide [38]. The original score for each scale or symptom item was converted to a 0-100 scale linearly. A higher score

Table 1. Demographics and characteristics of study participants

Characteristics	CALM (n=61)	Usual Care (n=54)	t/χ	*P*
Age, years, mean ± SD	66.8 ± 10.8	65.7 ± 9.0	0.57	0.57
Gender, n (%)			0.68	0.41
Female	15 (24.6)	17 (31.5)		
Male	46 (75.4)	37 (68.5)		
Education, n (%)			1.23	0.54
Some college or higher	2 (3.3)	4 (7.4)		
High school graduate	5 (8.2)	3 (5.6)		
Less than high school	54 (88.5)	47 (87.0)		
Cancer type, n (%)			12.64	0.18
Intestine	19 (31.1)	9 (16.7)		
Gallbladder	3 (4.9)	3 (5.6)		
Liver	7 (11.5)	3 (5.6)		
Esophagus	15 (24.6)	16 (29.6)		
Stomach	16 (26.2)	20 (37.0)		
Pancreas	1 (1.6)	3 (5.6)		
Cancer stage, n (%)			4.64	0.20
Stage I	3 (4.9)	7 (13.0)		
Stage II	8 (13.1)	12 (22.2)		
Stage III	19 (31.1)	13 (24.1)		
Stage IV	31 (50.8)	22 (40.7)		
Previous treatment, n (%)			9.08	0.06
Targeted therapy	13 (21.3)	2 (3.7)		
Radiation therapy	3 (4.9)	6 (11.1)		
Chemotherapy	27 (44.3)	29 (53.7)		
Immunotherapy	16 (26.2)	16 (29.6)		
Surgery	2 (3.3)	1 (1.9)		
KPS, n (%)			0.41	0.52
80	33 (54.1)	26 (48.1)		
90	28 (45.9)	28 (51.9)		

Abbreviations: CALM, Managing Cancer and Living Meaningfully; KPS, Karnofsky Performance Status.

on the functional scale represents a higher level of functioning, meaning a healthier cancer survivor, while a higher score on the symptom scale or item represents a higher level of symptoms or problems, or a less healthy cancer survivor [38]. If an item table is missing in the EORTC QLQ-C30 according to the instrument guide, it is not imputed [38]. In the EORTC QLQ-C30 multi-item scale, if half or more of the questions in the multi-item scale are answered, the scores were calculated by imputing the mean scores of the completed items for the missing items.

Statistical analysis

All data are expressed as the mean ± standard deviation. Statistical analysis was performed using IBM SPSS Statistics 23.0 software. Baseline group differences in sample characteristics were examined using independent sample t tests and χ^2 tests. Scores before and after the 2, 4, and 6 intervention sessions were analyzed by repeated-measures ANOVA. Repeated-measures ANOVA were used to compare the scores from the CALM group and the UC group. Repeated-measures ANOVA was used to analyze the interaction effect between the number of sessions (2, 4, and 6) and the groups (CALM group and UC group). All repeated-measures ANOVA results were adjusted for degrees of freedom for F ratios according to the Greenhouse-Geisser method. The correlation analysis between CRF and QOL scores was based on a linear correlation analysis. All analysis results were considered statistically significant at $P<0.05$.

Results

Baseline demographics and clinical data

As shown in **Table 1** and **Figure 1**, 224 patients with gastrointestinal cancer completed the PFS, and 74 patients were excluded because the overall score on the PFS was less than 7. Finally, 150 patients were eligible, but 24 patients declined to participate for various reasons, leaving 126 patients eligible. Sixty-eight patients were randomly assigned to the CALM group (n=68), and 58 were assigned to the UC group (n=58). However, 7 people did not complete the CALM intervention, and 4 people in the UC group did not complete the final assessment. In the final analysis, there were 61 participants in the CALM group and 54 participants in the UC group. There were no significant differences in demographic information, including age (t= 0.57, P=0.57), gender distribution (χ=0.68, P=0.41), educational level (χ=1.23, P=0.54),

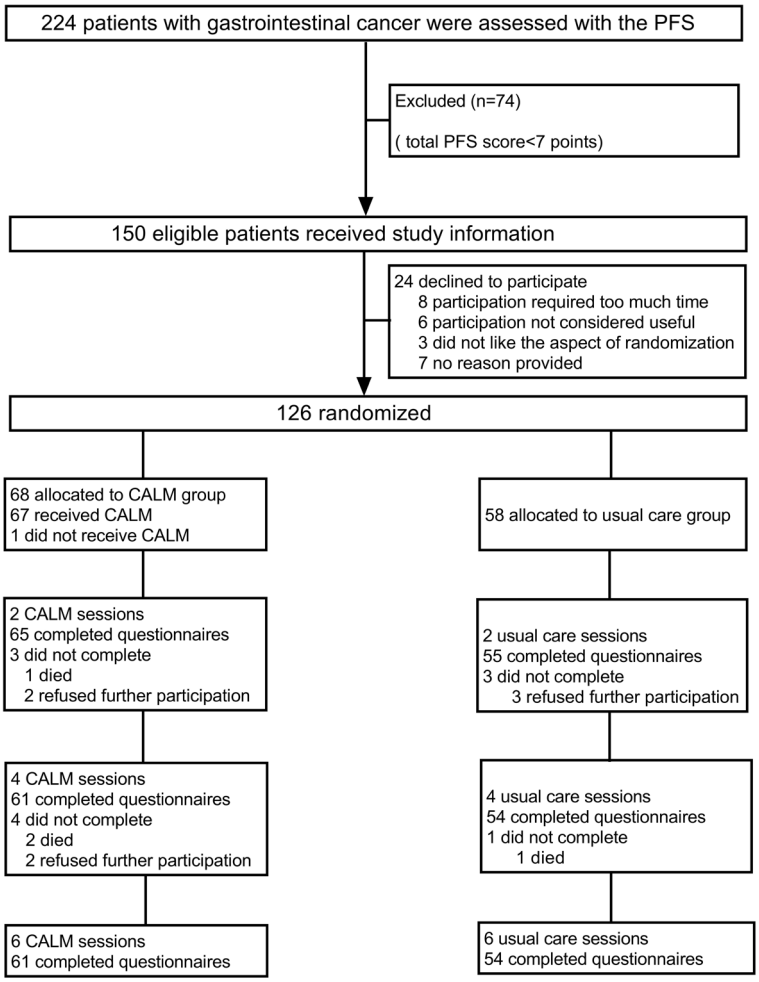

Figure 1. Research flowchart.

clinical information such as the Karnofsky performance status score (χ=0.41, P=0.52), cancer type (χ=12.64, P=0.18), cancer stage (χ=4.64, P=0.20), or previous treatment (χ=9.08, P=0.06) between the CALM group and UC group.

Changes in the piper fatigue scale and quality of life assessment scale scores over the course of treatment in the CALM group and the usual care group

As illustrated in **Table 2**, the total CRF, behavioral/daily life CRF, emotional/affective CRF, sensory/physical CRF and cognitive CRF scores decreased with an increasing number of CALM sessions, while the QOL scores increased with the increasing number of CALM sessions. There were statistically significant differences (F=3106.434, F=1113.831, F=1159.919, F=1502.266, F=820.275, F=606.513, respectively; P<0.001). As seen from **Table 3**, total CRF, behavioral/daily life CRF, emotional/affective CRF, sensory/physical CRF, and cognitive CRF scores all increased with an increasing number of UC sessions, while QOL scores decreased with the increasing number of UC sessions, showing statistically significant differences (F=166.518, F=23.283, F=34.657, F=27.463, F=206.407, F=87.493, respectively; P<0.001).

Comparison of piper fatigue scale and quality of life assessment scale scores between the CALM group and the usual care group

As shown in **Table 4**, by analyzing the comparisons of the scale scores (i.e., total CRF, behavioral/daily life CRF, emotional/affective CRF, sensory/physical CRF, cognitive CRF, and QOL scores) with repeated-measures ANOVAs, it was concluded that the main effect of group was significant (F=990.447, F=263.973, F=193.681, F=602.879, F=100.474, F=214.998, respectively; P<0.001), and the main effect of session was significant (F=2043.035, F=775.436, F=769.598, F=1111.595, F=387.373, F=216.114, respectively; P<0.001). The interaction between session and group was significant (F=2893.539, F=969.193, F=1021.123, F=1329.480, F=926.241, F=582.130, respectively; P<0.001).

Changes in the piper fatigue scale and quality of life assessment scale scores with an increasing number of sessions in the CALM group and the usual care group

As shown in **Figure 2**, total CRF, behavioral/daily life CRF, emotional/affective CRF, sensory/physical CRF, and cognitive CRF tended to decline, while QOL tended to increase in the CALM group. However, in the UC group, total CRF, behavioral/daily life CRF, emotional/affective CRF, sensory/physical CRF, and cognitive

Table 2. Changes in the piper fatigue scale and quality of life assessment scale scores over the course of treatment in the CALM group

Item (mean ± SD)	CALM (n=61)				*F*	*P*
	T0[a]	T2[a]	T4[a]	T6[a]		
Total CRF	8.22 ± 0.69	7.03 ± 0.62	3.33 ± 0.62	2.21 ± 0.68	3106.434	<0.001**
Behavior/daily life CRF	7.87 ± 1.23	6.73 ± 1.07	3.08 ± 0.99	1.94 ± 1.03	1113.831	<0.001**
Emotional/affective CRF	8.92 ± 1.61	7.66 ± 1.43	3.52 ± 1.07	2.18 ± 1.10	1159.919	<0.001**
Sensory/physical CRF	9.14 ± 0.94	7.81 ± 0.82	3.57 ± 0.91	2.22 ± 1.13	1502.266	<0.001**
Cognitive CRF	6.95 ± 1.53	5.94 ± 1.41	3.16 ± 1.18	2.48 ± 1.23	820.275	<0.001**
QOL	40.96 ± 14.58	56.16 ± 10.78	84.34 ± 6.59	86.34 ± 8.16	606.513	<0.001**

Abbreviations: CALM, Managing Cancer and Living Meaningfully; CRF, cancer-related fatigue; SD, standard deviation; QOL, quality of life. T0[a], before CALM treatment; T2[a], after 2 CALM sessions; T4[a], after 4 CALM sessions; T6[a], after 6 CALM sessions. **P<0.01.

Table 3. Changes in the piper fatigue scale and quality of life assessment scale scores over the course of treatment in the usual care group

Item (mean ± SD)	UC (n=54)				*F*	*P*
	T0[b]	T2[b]	T4[b]	T6[b]		
Total CRF	8.01 ± 0.57	8.13 ± 0.56	8.32 ± 0.48	8.62 ± 0.38	166.518	<0.001**
Behavior/daily life CRF	7.72 ± 1.17	7.81 ± 1.15	7.90 ± 1.02	8.11 ± 0.91	23.283	<0.001**
Emotional/affective CRF	8.76 ± 1.66	8.83 ± 1.62	8.99 ± 1.44	9.31 ± 1.17	34.657	<0.001**
Sensory/physical CRF	9.07 ± 0.96	9.18 ± 0.87	9.29 ± 0.76	9.43 ± 0.64	27.463	<0.001**
Cognitive CRF	6.51 ± 1.43	6.71 ± 1.36	7.09 ± 1.23	7.62 ± 1.09	206.407	<0.001**
QOL	43.76 ± 14.59	43.55 ± 13.46	37.86 ± 11.32	30.09 ± 11.15	87.493	<0.001**

Abbreviations: UC, usual care; CRF, cancer-related fatigue; SD, standard deviation; QOL, quality of life. T0[b], before UC treatment; T2[b], after 2 UC sessions; T4[b], after 4 UC sessions; T6[b], after 6 UC sessions. **P<0.01.

CRF showed an increasing trend, and QOL showed a downward trend.

Relationships between QOL and CRF in the CALM group and the usual care group

Figures 3 and **4** show that QOL was negatively correlated with CRF in the CALM group (before treatment: r=-0.46, P=0.0002; after 2 sessions: r=-0.46, P=0.0002; after 4 sessions: r=-0.51, P<0.0001; after 6 sessions: r=-0.44, p=0.0004) and the UC group (before treatment: r=-0.36, P=0.0067; after 2 sessions: r=-0.44, P=0.0010; after 4 sessions: r=-0.36, P=0.0082; after 6 sessions: r=-0.30, P=0.0258), indicating that the higher the CRF was, the worse the QOL was.

Discussion

In severely fatigued patients with gastrointestinal tumors, the CALM intervention significantly reduced fatigue and improved QOL. Our research showed that the CALM intervention had a positive effect on the fatigue and QOL of cancer patients. Our findings provide further evidence of the effectiveness of psychological interventions in cancer patients [21, 25].

Our research showed that the CALM intervention significantly reduced fatigue. Our findings are similar to a systematic review describing psychological interventions that are effective in cancer patients [9]. Possible explanations were proposed for why the CALM intervention significantly reduced fatigue in our trial. We still do not know what causes CRF [9, 18], but researchers see it as a multidimensional symptom with physical, mental and emotional aspects [9, 19, 20]. The ultimate goal of psychological intervention is to change cognition, mood, behavior, or a combination of these factors [9, 39]. Interventions targeting these processes may improve CRF [40]. This is consistent with our research results. The CALM intervention significantly reduced the scores of all subdomains of CRF, including behavior/daily life, sensory/physical, emotional/emotional meaning, and cognition.

Table 4. Comparison of piper fatigue scale and quality of life assessment scale scores between the CALM group and the usual care group

Item (mean ± SD)	CALM (n=61)				UC (n=54)				Group		Session		Group Session	
	T0	T2	T4	T6	T0	T2	T4	T6	*F*	*P*	*F*	*P*	*F*	*P*
Total CRF	8.22 ± 0.69	7.03 ± 0.62	3.33 ± 0.62	2.21 ± 0.68	8.01 ± 0.57	8.13 ± 0.56	8.32 ± 0.48	8.62 ± 0.38	*F*=990.447	*P*<0.001**	*F*=2043.035	*P*<0.001**	*F=2893.539*	*P*<0.001**
Behavior/daily life CRF	7.87 ± 1.23	6.73 ± 1.07	3.08 ± 0.99	1.94 ± 1.03	7.72 ± 1.17	7.81 ± 1.15	7.90 ± 1.02	8.11 ± 0.91	*F=263.973*	*P*<0.001**	*F=775.436*	*P*<0.001**	*F=969.193*	*P*<0.001**
Emotional/affective CRF	8.92 ± 1.61	7.66 ± 1.43	3.52 ± 1.07	2.18 ± 1.10	8.76 ± 1.66	8.83 ± 1.62	8.99 ± 1.44	9.31 ± 1.17	*F*=193.681	*P*<0.001**	*F=769.598*	*P*<0.001**	*F=1021.123*	*P*<0.001**
Sensory/physical CRF	9.14 ± 0.94	7.81 ± 0.82	3.57 ± 0.91	2.22 ± 1.13	9.07 ± 0.96	9.18 ± 0.87	9.29 ± 0.76	9.43 ± 0.64	*F*=602.879	*P*<0.001**	*F=1111.595*	*P*<0.001**	*F=1329.480*	*P*<0.001**
Cognitive CRF	6.95 ± 1.53	5.94 ± 1.41	3.16 ± 1.18	2.48 ± 1.23	6.51 ± 1.43	6.71 ± 1.36	7.09 ± 1.23	7.62 ± 1.09	*F=100.474*	*P*<0.001**	*F=387.373*	*P*<0.001**	*F=926.241*	*P*<0.001**
QOL	40.96 ± 14.58	56.16 ± 10.78	84.34 ± 6.59	86.34 ± 8.16	43.76 ± 14.59	43.55 ± 13.46	37.86 ± 11.32	30.09 ± 11.15	*F=214.998*	*P*<0.001**	*F=216.114*	*P*<0.001**	*F=582.130*	*P*<0.001**

Abbreviations: CALM, managing cancer and living meaningfully; UC, usual care; CRF, cancer-related fatigue; SD, standard deviation; QOL, quality of life. **P<0.01. Within-subject effects (DF=1, 114).

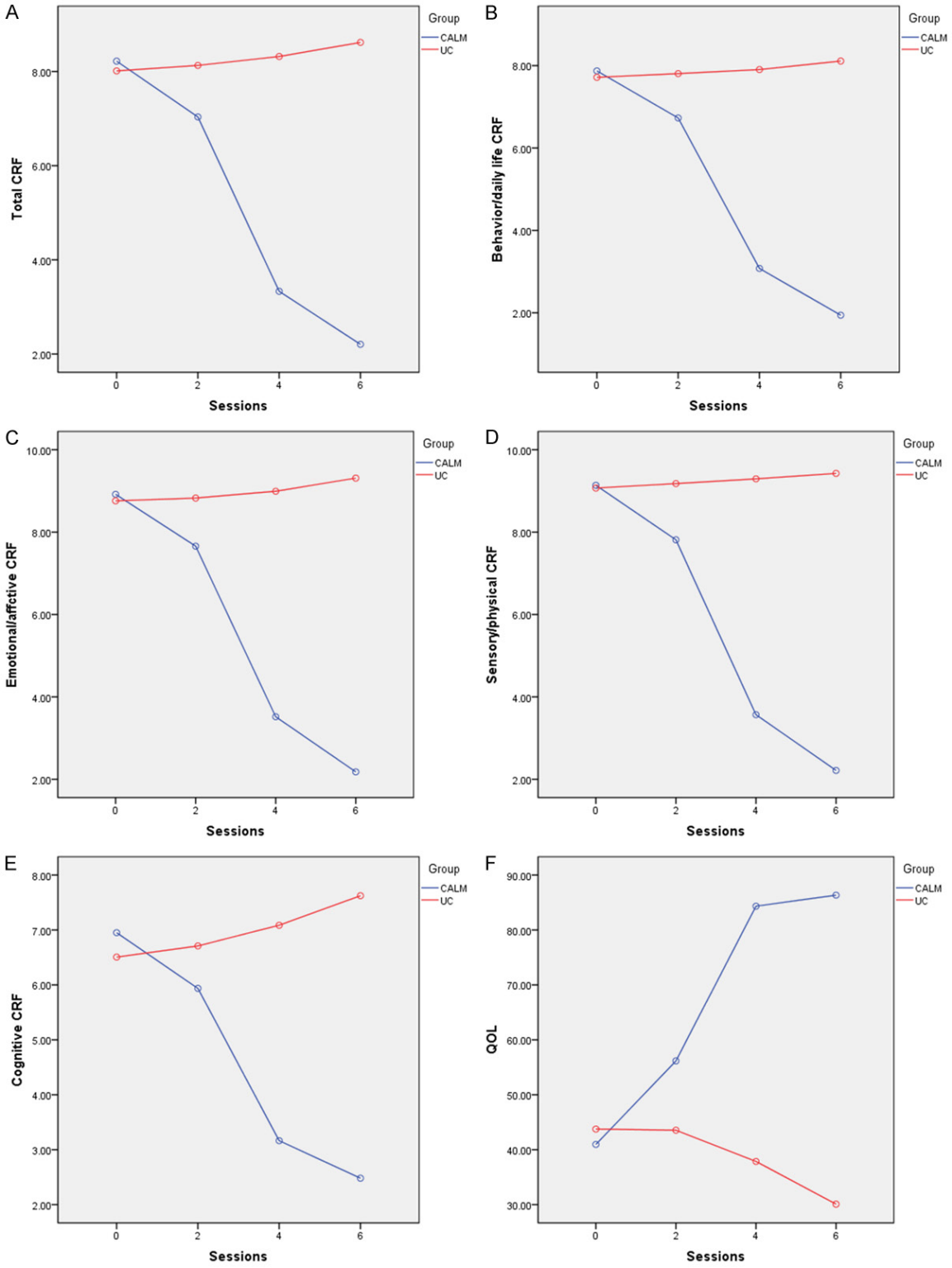

Figure 2. Changes in the piper fatigue scale and quality of life assessment scale scores with an increasing number of sessions in the CALM group and the usual care group.

Our research also showed that the CALM intervention improved the QOL of patients. This finding was similar to the report by Tu et al. [21]. The World Health Organization (WHO) defines quality of life as "the overall satisfaction of individuals from different cultures and

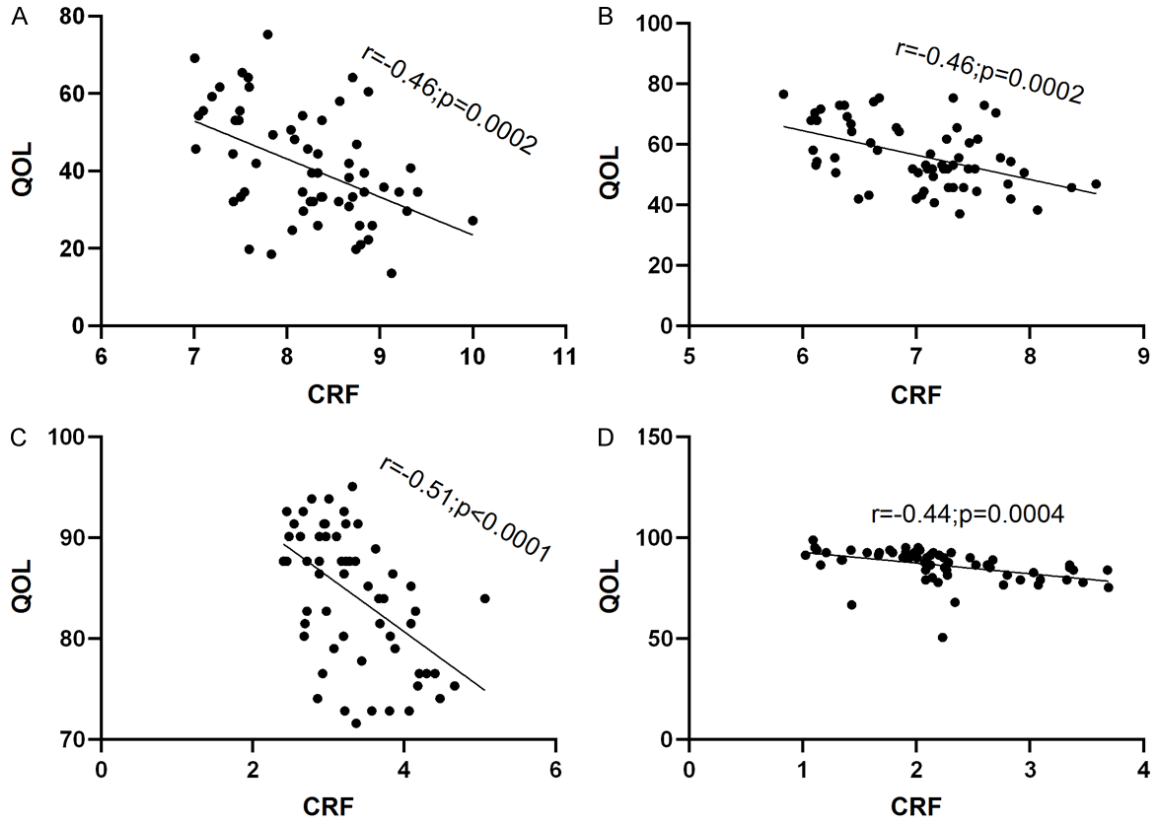

Figure 3. Relationships between QOL and CRF in the CALM group. Note: A. Before CALM treatment; B. After 2 CALM sessions; C. After 4 CALM sessions; D. After 6 CALM sessions.

value systems with their living conditions related to their goals, expectations, standards and concerns, as well as their general sense of personal health". It is generally believed that quality of life is a comprehensive measure of the physical, psychological and social adaptability of individuals or groups. It is a very broad concept that combines in a complex way people's physical health, mental state, degree of independence, social relationships, personal beliefs and their relationship to salient features of the environment [41]. On the one hand, communicating with patients, popularizing cancer-related knowledge, changing patients' misunderstandings about cancer, alleviating anxiety, allowing patients to have confidence in their own treatment plans, and reshaping their hope in life can lead to improvements in patients' QOL. On the other hand, by helping patients physically and mentally relax, encouraging patients to communicate with friends and relatives, and integrating into society, the scope of interpersonal communication has been expanded, their sense of social support has been enhanced, and their QOL has been improved.

Our research has several advantages. First, the CALM intervention is theoretically sound and meets contemporary requirements for developing interventions to reduce CRF and maintain quality of life during cancer treatment. Second, fatigue severity was used as a screening criterion, and the primary outcome measure was a valid questionnaire.

The trial does have some limitations. First, this study had a small sample size. Second, there is a lack of follow-up assessment of the sustained impact of CALM on CRF over time.

Conclusions

The CALM intervention can reduce the fatigue of cancer survivors and improve their QOL. It is very important to strengthen psychological intervention for cancer survivors. Based on the theories underlying the CALM intervention, implementation of the CALM intervention is helpful for the physical and mental health of cancer survivors. This study suggests that CALM may be an effective way to reduce CRF.

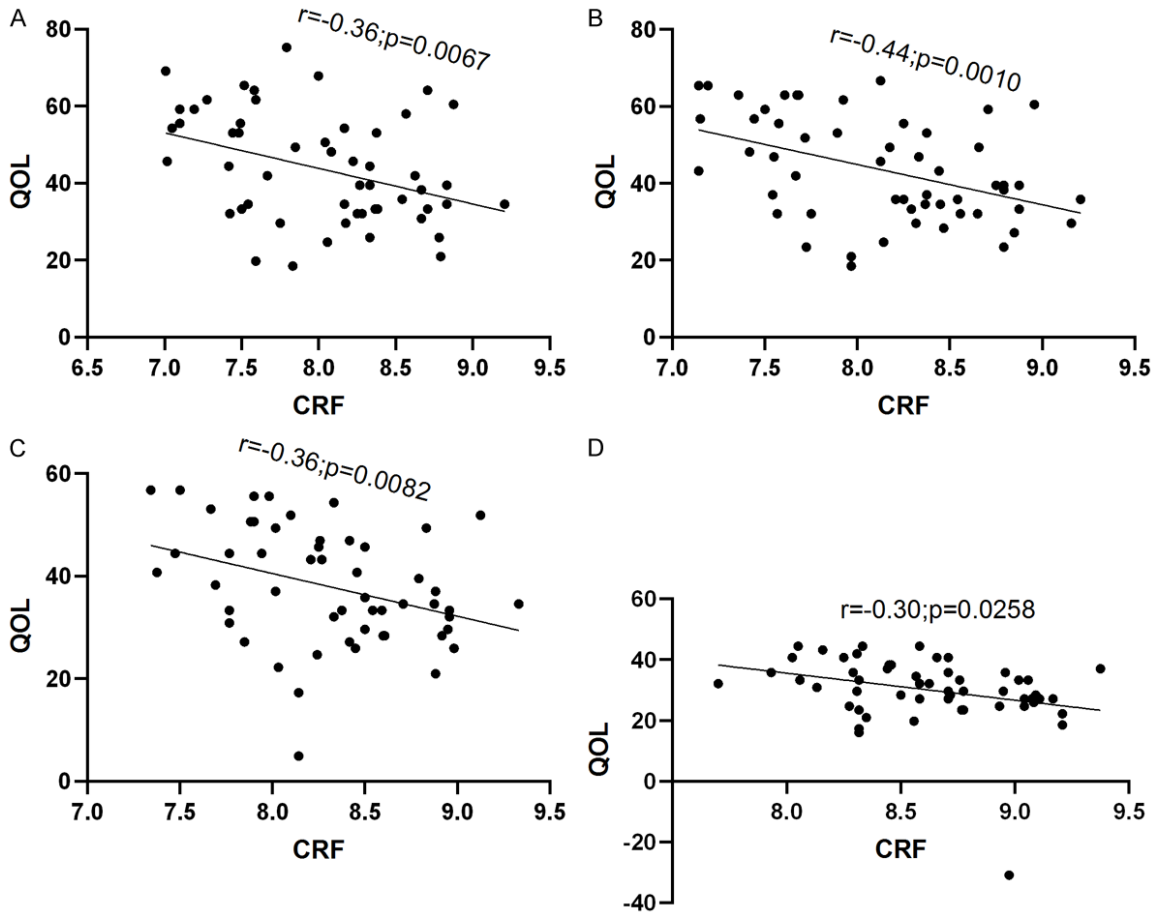

Figure 4. Relationships between QOL and CRF in the usual care group. Note: A. Before UC treatment; B. After 2 UC sessions; C. After 4 UC sessions; D. After 6 UC sessions.

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Disclosure of conflict of interest

None.

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