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ORIGINAL ARTICLE

Telephone-based reminiscence therapy for colorectal cancer patients undergoing postoperative chemotherapy complicated with depression: a three-arm randomised controlled trial

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Abstract

Background Colorectal cancer patients undergoing postoperative chemotherapy often exhibit symptoms of depression that in turn may negatively affect outcome. The aim of this study was to assess the efficacy of telephone-based reminiscence therapy on the depression, anxiety, subjective well-being, and social support of colorectal cancer patients undergoing postoperative chemotherapy complicated with depression.

Methods Patients were divided randomly into a control group (CON, $n = 45$), telephone support group (TS, $n = 45$), and telephone-based reminiscence therapy group (TBR, $n = 45$). Patients in TS and TBR groups received six 20–40-min telephone intervention sessions conducted weekly. Patients were assessed at baseline and at 6 weeks. The primary outcomes were changes on the Self-Rating Depression Scale (SDS) and Hamilton Depression Scale (HAMD), which were used to evaluate depression symptoms. Secondary outcomes were changes in Self-Rating Anxiety Scale (SAS), Hamilton Anxiety Scale (HAMA), Memorial University of Newfoundland Scale of Happiness (MUNSH), and Perceived Social Support Scale (PSSS) scores, which were used to evaluate anxiety symptoms, subjective well-being, and social support, respectively.

Results After 6 weeks, SDS and HAMD scores were significantly lower than pre-intervention baseline in the TBR group but not in the CON and TS groups ($P < 0.05$). Both SAS and HAMA scores were significantly reduced in TBR and TS groups but not the CON group ($P < 0.05$) following intervention; however, there was no significant difference in post-intervention scores between TS and TBR groups ($P > 0.05$). Neither telephone support nor telephone-based reminiscence therapy improved subjective well-being or social support ($P > 0.05$).

Conclusions These findings suggest that telephone-based reminiscence therapy can reduce depression symptoms in colorectal cancer patients undergoing postoperative chemotherapy. Telephone-based reminiscence therapy may also improve anxiety, but no better than telephone support. Alternatively, telephone-based reminiscence therapy did not improve subjective well-being or social support. We suggest that clinicians provide appropriate telephone-based reminiscence therapy in long-term care institutions based on patient mental health status.

Keywords Colorectal cancer · Depression · Anxiety · Telephone-based reminiscence therapy · Telephone psychological support

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Background

In China, colorectal cancer ranks 3rd in morbidity and 5th in mortality among all cancers, and these rates appear to be growing [1]. Among newly diagnosed colorectal cancer patients, approximately 90% are over 50 years of age, and over 70% are elderly (over 65 years old) [2]. Auxiliary chemotherapy is a key component of comprehensive colorectal cancer treatment. In a study by Medeiros et al. (2010), postoperative patients undergoing chemotherapy reported higher levels of depression than patients not currently undergoing chemotherapy; indeed, depression prevalence in the chemotherapy groups was 36.8% [3]. Moreover, a reduction in self-esteem and subjective well-being of patients undergoing chemotherapy has been reported [4]. Research suggests that negative emotions, such as depression and anxiety, both increase negative side effects and impede recovery [5]. Therefore, it is critical to effectively treat unhealthy emotions and conditions in this patient group.

Many psychological interventions have demonstrated efficacy for improving unhealthy emotions in cancer patients [6]. The Pan-Canadian Practice Guideline: Screening, Assessment and Care of Psychosocial Distress (Depression, Anxiety) in Adults with Cancer recommends that tumour patients with mild to moderate depression receive psychological interventions. Tumour patients who have severe depression symptoms should thus be transferred to the psychiatry department for treatment after appropriate risk evaluation [7]. Many common psychological intervention methods have been evaluated for cancer patients and therapeutic efficacy confirmed. However, there are few convenient, rapid, and effective psychological interventions with demonstrated efficacy for colorectal cancer patients. With expanding global telephone access, a growing number of researchers are beginning to focus on telephone-delivered psychotherapies. Telephone intervention had the advantages of strong operability and high performance: cost ratio. Moreover, educational, economic, and auxiliary facility requirements are low, resulting in wide acceptance by patients. Such telephone-delivered interventions, including psychoeducational interventions, cognitive–behavioural therapy, and interpersonal psychotherapy, have achieved good therapeutic effects for the treatment of cancer patients with depression [8–10].

Reminiscence therapy is a psychological intervention specifically designed to address issues of particular relevance to older adults. For persons with rich life experiences, the opportunity to systematically and structurally review and rethink one's life and to self-examine or redefine the self can improve the capacity to face the distress of life and resist unhealthy emotions such as depression and anxiety [11, 12]. Many patients experience existential suffering such as a sense of meaningless of life or loss of purpose for living while undergoing anti-cancer treatment [13]. During reminiscence therapy, patients review stories about their lives to address their illness. Reminiscence is defined as memory recall that is usually characterised as simple daydreaming, storytelling, or nostalgia by oneself or with others [14], and reminiscence therapy has been shown to improve depression and self-esteem in older adults [15]. Reminiscence therapy has also been shown to reduce depression symptoms in young (around 25 years) and middle-aged (around 50 years) adults [16, 17]. Therefore, reminiscence-based therapies may provide a useful tool for young and middle-age patients to gather insights from the past to use in the present and to prepare for the future. Compared to older adults (> 45 years), however, younger adults (18–45 years) show a greater tendency for bitterness when remembering times of distress or negative feelings. Given that these memories are likely to be more recent, young adults may benefit from contextualising experiences and reappraising them relative to the present, thereby balancing negative with positive memories. This process is likely to be particularly useful for depressed younger adults [18].

Life review is one style of reminiscence therapy with demonstrate efficacy for improving the spiritual well-being of terminally ill cancer patients [19]. A recent meta-analysis concluded that reminiscence therapy can promote psychological health and improve quality of life among the elderly [20]. Ando et al. (2011) also found that reminiscence therapy improved the spiritual well-being and self-esteem of five cancer patients (between 45 and 65 years of age) [13]. To the best of our knowledge, there is no research on the use of reminiscence therapy delivered by telephone for the treatment of depression in cancer patients undergoing chemotherapy.

This study examined the practicability and effectiveness of telephone-delivered reminiscence therapy for reducing the depression and anxiety of Chinese colorectal cancer patients with mild to moderate depression symptoms during postoperative chemotherapy.

Methods

Trial design and setting

The study was approved by the Ethics Committee of China Medical University (No. AF-OG-03-1.0-02) and subsequently registered at the China Clinical Trial Registration Center (ChiCTR-ROC-17010587). Prior to enrolment in the study, written informed consent was obtained from the participants. It was designed as a 6-week, three-arm randomised controlled trial commencing in September 2015, and conducted at the First Hospital of China Medical University and the Anus and Intestine Surgery Department of Tumor Hospital of China Medical University. The study was completed in December 2016.

Participants

All patients had colorectal cancer diagnosis confirmed by pathology and/or cytology prior to enrolment. Inclusion criteria were (1) ≥ 18 years of age; (2) Self-Rating Depression Scale score of 50–70; (3) willing to comply with study protocols; (4) expected survival time of over 6 months; (5) aware of personal disease status; (6) understanding the study and being voluntarily recruited; (5) no history of other malignant tumours, personal psychiatric conditions, a family history of psychosis, or special medication history of psychoactive drugs; and (6) not treated with antidepressant drugs. Exclusion criteria were uncontrolled factors such as disease exacerbation or inability to complete the trial.

Interventions

To enhance patient participation, before recruitment, all patients participated in a 90-min physiological and psychological education lecture based on *The SIGN guidelines on colorectal cancer* [21], which included information on mental health adjustment, precautions during chemotherapy, side effects of chemotherapy, body care, and healthy diet. During every session, the patients would receive diet guidance. Patients in the control (CON) group received all these same interventions and the usual hospital care. Patients receive routine care including advice on diet and side effects of chemotherapy as well as stoma care. Diet advice includes eating digestible, less cellulose and high-protein foods, avoiding raw foods, developing good bowel habits. Advices on side effects of chemotherapy includes selecting conservative treatment or drug therapy, according to the severity of side effects (nausea and vomiting; alopecia, pigmentation, rash; myelosuppression, etc.). Stoma care advice includes opening the fistula regularly, keeping the fistula clean and preventing skin infection. For the telephone support (TS) group and telephone-based reminiscence therapy (TBR) group, a telephone intervention was delivered by a trained psychologist. Treatment included either a questionnaire survey (CON group), telephone counselling (TS group), or telephone-based reminiscence therapy (TBR group). The telephone support intervention received by patients in the TS group was developed from previous findings on the special needs of colorectal cancer patients [22, 23]. Specific questions related to changes in condition, new symptoms, fear of recurrence, treatment and side effects, genetic risk, self-care (diet, support groups, finances), and family concerns. Six sessions were conducted, and the intervention consisted of six 20 to 40-min telephone sessions conducted weekly. The telephone-based reminiscence therapy consisted of six topics delivered during weekly 20 to 40-min sessions. Telephone-based reminiscence therapy was performed as described previously with modification based on psychological characteristics (pessimism, anxiety, fear, low self-esteem, etc.) of patients [24–27]. These six sessions are listed below.

- Week 1: The psychologist guided the patient to reminisce about people who had a positive influence on their life.
- Week 2: The patient reminisced about happy times in their past.
- Week 3: The patient talked about his or her past achievements and the significance of these achievements.
- Week 4: The patient recalled the important turning points in his or her lives and the influence of each.
- Week 5: The patient talked about his or her struggles with cancer and its positive significance.
- Week 6: The patient talk about his or her hopes for the future.

Outcome measurements

The primary outcome was depression symptom severity as measured by the Chinese version of the Self-Rating Depression Scale (SDS) and Hamilton Depression Scale (HAMD-24). These scales show good reliability and validity and are suitable for use by adults and elderly [28]. The key secondary outcomes were as follows: (1) anxiety symptom severity as measured by the Chinese version of the Self-Rating Anxiety Scale (SAS) and Hamilton Anxiety Scale (HAMA) [28, 29]; (2) subjective well-being as measured by the Memorial University of Newfoundland Scale of Happiness (MUNSH), a self-report measure of subjective well-being containing 24 items that address affect during the preceding month and longer-term affective experiences [30, 31]; and (3) social support status as measured by the Perceived Social Support Scale (PSSS), which is frequently used to assess social support for cancer patients [32]. Data acquired before and after the 6-week trial were collected separately by authors CZ and XD.

Sample size calculation

The sample size calculation was based on the results of our preliminary experiment ($n = 21$). Using the observed reduction in mean SDS score from baseline to post-intervention, we found that 45 patients are required in each group to detect this difference with a two-sided alpha of 0.05 and power of 80%. Sample size was calculated using the following formula [33]:

$$N = \Psi^2\left(\sum S_i^2/g\right)/\left[\sum\left(\overline{X}_i - \overline{X}\right)^2/(g-1)\right]$$

(N: Sample size of each group; $g = 3$; $\overline{X}$: the mean; Si: the standard deviation; $\alpha = 0.05$; $1 - \beta = 0.80$, $\Psi = 2.68$)

Randomisation

After baseline assessment, patients were randomly assigned to the control group (CON, $n = 45$), telephone general support intervention group (TS, $n = 45$), or telephone reminiscence therapy intervention group (TBR, $n = 45$) using computer-generated random numbers (EPIDAT 3.1, Xunta de Galicia, Spain, PAHO, 2006). These numbers were provided in numbered opaque envelopes by an external staff member (FL), ensuring that assessors were blinded to treatment group assignment.

Statistical methods

IBM SPSS19.0 (SPSS Inc., Chicago, IL, USA) was used for all data analyses. Continuous data are presented as mean ± standard deviation (M ± SD) and categorical data as percentage. Differences in baseline characteristics among groups were evaluated using the chi-square (χ^2) test or one-way analysis of variance (ANOVA) depending on the type of variable. Repeated-measures ANOVA was used to assess the effect of intervention × time. A $P < 0.05$ was considered statistically significant for all tests.

Results

Participant baseline characteristics

The study protocol is illustrated schematically in Fig. 1. Our sample ($n = 135$) had a mean age of 59.09 ± 8.07 years, the male-to-female ratio was 67:68, the single-to-married-to divorced/widowhood ratio was 2:121:12, 94 (69.63%) patients with rectum cancer and 41 (30.37%) patients with colon cancer, the SDS scores at baseline was 60.45 ± 4.96, and the HAMD scores at baseline was 14.47 ± 4.24. A total of 135 patients were divided into the CON group, the TS group, and the TBR group, $n = 45$ for each group. There were no significant differences in sex ratio, age, marital status, education, income, tumour location, baseline SDS, and baseline HAMD ($P > 0.05$) among the three groups (Table 1). All patients showed good adherence and none dropped out of the study.

Primary outcomes

In the TBR group, both SDS and HAMD scores were significantly lower after intervention compared to baseline ($P < 0.05$), while there were no significant changes in SDS and HAMD scores from baseline in either the CON or TS group (Table 2). Further, post-intervention scores were significantly lower in the TBR group than the TS and CON groups ($P < 0.05$). Therefore, telephone-based reminiscence therapy improved depression symptoms in colorectal cancer patients undergoing postoperative chemotherapy complicated with depression.

Secondary outcomes

As shown in Table 3, SAS and HAMA scores were significantly reduced in both the TBR and TS groups compared to baseline ($P < 0.05$), while there were no significant changes in the CON group ($P > 0.05$). However, post-intervention scores did not differ between the TS and TBR group ($P > 0.05$), indicating that both telephone support and telephone-based reminiscence therapy improved anxiety, and that reminiscence therapy was no more effective. In contrast, neither telephone support nor telephone-based reminiscence therapy improved subjective well-being or social support ($P > 0.05$, Table 4).

Discussion

Cancer-related depression is a pathological affective response to loss of normality in one's personal world as a result of cancer diagnosis, treatment, or impending complications. Repeated hospitalisation and the side effects of chemotherapy are major factors influencing depression [34]. Previous studies have reported that 20% of colorectal cancer patients undergoing postoperative chemotherapy exhibit signs of depression [3]. Reminiscence therapy is used increasingly for treating psychological problems in adults, especially among the elderly [17, 35], and has been shown to significantly improve depression symptoms [16, 36]. The telephone is a ubiquitous communication tool, so telephone-based interventions are highly cost-effective and widely accepted by patients. This is the first study to apply reminiscence psychotherapy as telephone intervention for colorectal cancer patients undergoing postoperative chemotherapy. We found that telephone-based reminiscence therapy improved depression symptoms in this group. Moreover, telephone-based reminiscence therapy improved anxiety but the effect was no better than simple telephone support. We also found telephone-based reminiscence therapy could not improve subjective well-being and social support.

Self-report depression scores were also improved in the TS group after 6 weeks, but the decrease from baseline did not reach statistical significance. Alternatively, the SAS and HAMA scores were significantly reduced compared to both baseline and mean post-intervention score in the CON group. Thus, TS intervention appeared to improve anxiety but had only marginal effects on depression. In contrast, previous findings suggested that TS can also improve depression. An early systematic review of randomised controlled trials demonstrated the potential of telehealth interventions for improving outcomes in cancer care. In this review, two of the three

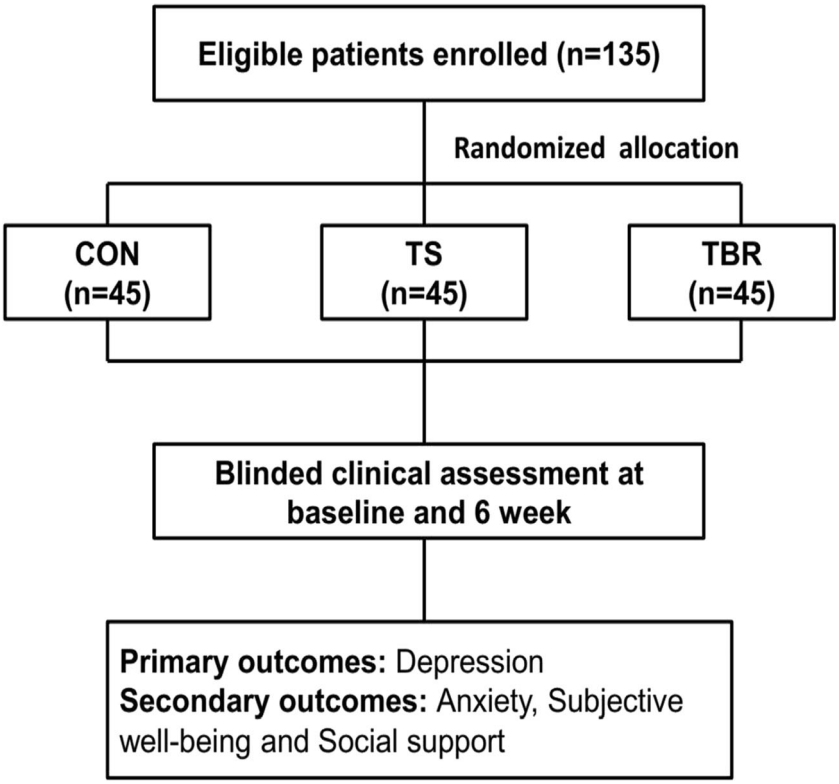

Fig. 1 Recruitment and participant flow. CON: control group; TS: telephone general support intervention group; TBR: telephone reminiscence therapy intervention group

studies focusing on pain control reported significant effects of the intervention and four of the nine studies focusing on depression reported significant effects [37]. Conversely, White et al. found that telephone intervention had no effect on depression or supportive care needs in people with colorectal cancer, although in accord with the current study it could reduce anxiety levels [38]. In a study from Livingston et al. (2010), male patients with cancer were willing to discuss psychosocial issues via telephone, but no psychological impact was found [39]. These discordant results may be explained by differences in (1) expertise of the personnel delivering the intervention, (2) the degree of psychological need in different stages of cancer, (3) the inherent efficacy of the intervention programme, and (or) (4) the follow-up time [38].

In the present study, reminiscence psychotherapy as a telephone intervention was delivered once per week for 20–40 min over six sessions. This programme is based on the notion that reviewing life events, feelings and previous thoughts can facilitate a sense of joy, enhance quality of life, and help patients adapt to their current situations. Through such recollection of personal events, family members, accomplishments, and social roles, cancer patients confirm their self-identity and self-continuity. We also guided patients to place life events in a new mental structure to expand their understanding of life's meaning. Reminiscence may help colorectal cancer patients undergoing postoperative chemotherapy to re-appraise their past in a more positive light, thereby improving depression and anxiety [40].

A large number of studies have demonstrated the efficacy of reminiscence therapy for improving cognition, psychological function, behaviour, both physical and mental health (including depression and anxiety), self-esteem, life satisfaction, and well-being [40, 41]. In this study, both depression and anxiety levels were significantly reduced after 6 weeks of telephone-based reminiscence therapy. This efficacy against depression may be explained in part by the ages of the TBR group subjects, as 57.78% (26/45) were older than 60 years and reminiscence therapy was specifically designed for older adults [20, 27, 35]. However, many previous studies also demonstrated that reminiscence therapy can be used effectively for young and middle-aged adults [16, 17]. The results of the current study support the validity and feasibility of telephone-based reminiscence therapy for improving depression and anxiety symptoms among both younger and older colorectal cancer patients.

Well-being is the subjective experience of one's happiness and is strongly associated with health [42]. In contrast to depression and anxiety, however, neither subjective well-being nor social support status was improved. In contrast, a study by Moral et al. (2015) found that reminiscence therapy improved self-esteem, integrity, life satisfaction, and psychological well-being as well as depression symptoms in older adults [43]. Ando et al. (2011) also found that three reminiscence therapy sessions significantly improved spiritual well-being and self-esteem in a group of five middle-aged cancer patients [13]. We speculate that this difference in outcome may stem from

Table 1 Comparison of general demographic characteristics among intervention groups

	CON $n = 45$	TS $n = 45$	TBR $n = 45$	X^2/F	P value*
Sex, n (%)				0.42	0.81
Male	22 (48.89)	21 (46.67)	24 (53.33)		
Female	23 (51.11)	24 (53.33)	21 (46.67)		
Age, n (%) (years)				3.64	0.73
< 50	4 (8.89)	7 (15.55)	4 (8.89)		
50–60	17 (37.78)	17 (37.78)	15 (33.33)		
60–70	21 (46.67)	17 (37.78)	19 (42.22)		
> 70	3 (6.66)	4 (8.89)	7 (15.56)		
Marital status, n (%)				1.53	0.82
Single	1 (2.22)	0 (0.00)	1 (2.22)		
Married	41 (91.11)	40 (88.89)	40 (88.89)		
Divorced/widowhood	3 (6.67)	5 (11.11)	4 (8.89)		
Education, M(SD) (years)	11.60 (5.25)	12.11 (3.99)	12.27 (4.80)	0.52	0.75
Personal monthly income, n (%) (RMB)				7.318	0.29
< 2000	18 (40.00)	15 (33.33)	10 (22.22)		
2000–4000	18 (40.00)	25 (55.56)	22 (48.89)		
4000–6000	7 (15.56)	4 (8.89)	9 (20.00)		
> 6000	2 (4.44)	1 (2.22)	4 (8.89)		
Residence, n (%)				5.22	0.27
Town	28 (60.00)	28 (60.00)	29 (68.57)		
County town	8 (17.14)	2 (8.57)	5 (2.86)		
Countryside	9 (22.86)	15 (31.43)	11 (28.57)		
Tumour location, n (%)				3.64	0.16
Rectum	30 (71.43)	36 (85.71)	28 (62.86)		
Colon	15 (28.57)	9 (14.29)	17 (37.14)		
SDS, M(SD)	60.2 (3.87)	61.5 (4.98)	59.5 (5.73)	1.92	0.15
HAMD, M(SD)	14.9 (4.91)	15.1 (3.58)	13.3 (3.98)	2.52	0.09

CON control group, *TS* telephone general support intervention group, *TBR* telephone reminiscence therapy intervention group, *SDS* Self-Rating Depression Scale, *HAMD* Hamilton Depression Scale

*P values are derived from the chi-square (χ^2) test or one-way ANOVA

factors such as intervention duration, differences in measurement scales, personal characteristics of the patients, social interpersonal relationships maintained by the patients, or the effects of chemotherapy (which may reduce the energy needed for psychological improvement). Social support, as one of the intermediary factors of social psychological stress, merits

Table 2 Depression scale scores at baseline and after intervention (mean (SD))

Time/group	SDS ($n = 45$ per group)			HAMD ($n = 45$ per group)		
	CON	TS	TBR	CON	TS	TBR
Baseline	60.21 ± 3.87	61.56 ± 4.98	59.57 ± 5.73	14.96 ± 4.91	15.13 ± 3.58	13.33 ± 3.98
Week 6	59.45 ± 4.47#	59.20 ± 6.62#	45.27 ± 8.86*	15.78 ± 4.68#	14.38 ± 4.81#	4.76 ± 4.03*
Holistic analysis (F, P)		(Huynh-Feldt, 0.931)		(Huynh-Feldt, 0.849)		
Group	49.309, 0.000			39.408, 0.000		
Time	70.087, 0.000			36.652, 0.000		
Group × Time	47.191, 0.000			56.902, 0.000		
Group (P)	CON vs TS	CON vs TBR	TBR vs TS	CON vs TS	CON vs TBR	TBR vs TS
Baseline	0.154	0.436	0.100	0.851	0.084	0.052
Week 6	0.806	0.000	0.000	0.179	0.000	0.000
Time (P)	CON	TS	TBR	CON	TS	TBR
Week 6 vs baseline	0.364	0.094	0.000	0.153	0.385	0.000

LSD test was used for comparison between groups. Compared with baseline, *$P < 0.05$. Compared with TBR, #$P < 0.05$

CON control group, *TS* telephone general support intervention group, *TBR* telephone reminiscence therapy intervention group, *SDS* Self-Rating Depression Scale, *HAMD* Hamilton Depression Scale

Table 3 Anxiety scale scores at baseline and after intervention (mean (SD))

Time/group	SAS ($n = 45$ per group)			HAMA ($n = 45$ per group)		
	CON	TS	TBR	CON	TS	TBR
Baseline	51.71 ± 5.79	47.28 ± 11.76	42.33 ± 9.02	13.82 ± 6.98	7.16 ± 4.31	6.42 ± 4.74
Week 6	51.88 ± 6.43	39.92 ± 11.01*#	36.39 ± 10.32*#	14.27 ± 6.74	4.56 ± 2.93*#	4.22 ± 2.83*#
Holistic analysis (*F*, *P*)		(Huynh-Feldt, 0.786)		(Huynh-Feldt, 0.842)		
Group	26.555, 0.000			57.084, 0.000		
Time	17.136, 0.000			23.069, 0.000		
Group × Time	3.932, 0.024			9.105, 0.000		
Group (*P*)	CON vs TS	CON vs TBR	TBR vs TS	CON vs TS	CON vs TBR	TBR vs TS
Baseline	0.051	0.000	0.059	0.000	0.000	0.407
Week 6	0.000	0.000	0.178	0.000	0.000	0.550
Time (*P*)	CON	TS	TBR	CON	TS	TBR
Week 6 vs baseline	0.741	0.003	0.019	0.542	0.000	0.000

LSD test was used for comparison between groups. Compared with baseline, $^{*}P < 0.05$. Compared with CON, $^{\#}P < 0.05$

CON control group, *TS* telephone general support intervention group, *TBR* telephone reminiscence therapy intervention group, *SDS* Self-Rating Depression Scale, *HAMD* Hamilton Depression Scale

greater research attention given its role in relieving social pressure, enhancing immunologic function, increasing therapeutic results, and improving prognosis. Chronic illness can exhaust people's network and strain relations with family and close friends, leading to isolation or less satisfaction with one's social support. Physical symptoms and related disability can also make attending social activities difficult. Better social support is associated with positive indices of mental and physical health [44]. Improvement in depression symptoms was associated with improvement in social support [44]. In this study, social support status was not improved after intervention. It is difficult to know whether the interaction of social support with the treatments was affected by their mode of delivery, which needed to be discussed in further.

This study has several limitations. First, we did not collect pathological grading and staging data of colorectal cancer, and previous studies have shown that the severity of depression in colorectal cancer patients is related to pathological grade [45]. Therefore, it is unclear if this intervention was equally effective in patients in different disease stages. Second, follow-up time was relatively short, so it remains unclear whether this therapy has long-term effects. We think that telephone-based reminiscence therapy may be applied in long-term care institutions to improve patients' mood and quality of life. Future

Table 4 Subjective well-being and social support scores at baseline and after intervention (mean (SD))

Time/group	MUNSH ($n = 45$ per group)			PSSS ($n = 45$ per group)		
	CON	TS	TBR	CON	TS	TBR
Baseline	22.40 ± 8.26	22.76 ± 9.58	27.71 ± 7.43	59.27 ± 10.93	61.84 ± 9.70	63.60 ± 8.18
Week 6	21.20 ± 10.50	24.00 ± 7.52	28.76 ± 6.52	59.71 ± 9.79	62.16 ± 10.54	63.49 ± 6.92
Holistic analysis (*F*, *P*)		(Huynh-Feldt, 0.838)		(Huynh-Feldt, 0.702)		
Group	13.364, 0.000			2.724, 0.071		
Time	0.227, 0.636			0.088, 0.768		
Group × Time	0.785, 0.472			0.037, 0.963		
Group (*P*)	CON vs TS	CON vs TBR	TBR vs TS	CON vs TS	CON vs TBR	TBR vs TS
Baseline	0.863	0.000	0.002	0.295	0.520	0.383
Week 6	0.055	0.001	0.016	0.101	0.071	0.526
Time (*P*)	CON	TS	TBR	CON	TS	TBR
Week 6 vs baseline	0.539	0.292	0.313	0.834	0.733	0.904

LSD test was used for comparison between groups

CON control group, *TS* telephone general support intervention group, *TBR* telephone reminiscence therapy intervention group, *MUNSH* Memorial University of Newfoundland Scale of Happiness, *PSSS* Perceived Social Support Scale

research is needed to explore factors that may affect happiness and social support in colorectal cancer patients undergoing postoperative chemotherapy. Fourth, reminiscence therapy is specifically designed to address issues of particular relevance to older adults (≥ 60 years). In this study, however, 15 of 45 patients (33.33%) in the TBR group were middle-aged (50–60 years). Although previous studies have found that reminiscence therapy can improve negative emotions among middle-aged adults [16], it is still necessary to design intervention programs specifically for other populations. Lastly, the intervention scheme will affect the curative effect; future research is needed to further improve reminiscence therapy schemes in different cancer groups.

In conclusion, our study demonstrates that telephone-based reminiscence therapy can improve depression symptoms in colorectal cancer patients undergoing postoperative chemotherapy. Telephone-based reminiscence therapy can also improve anxiety but no more effectively than telephone support. Telephone-based reminiscence therapy did not improve subjective well-being or social support, in contrast to several previous studies.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflicts of interest.

Ethical approval The study was approved by the Ethics Committee of China Medical University (No. AF-OG-03-1.0-02).

Informed consent Informed consent was obtained from all individual participants included in the study.

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