

Original Article

Effect of at-home cognitive behavior therapy combined with nursing on revised piper fatigue scale, pittsburgh sleep quality index, self-rating anxiety scale and self-rating depression scale of ovarian cancer patients after chemotherapy

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Abstract: This study was designed to investigate the nursing effect of at-home cognitive behavioral therapy in ovarian cancer patients who underwent chemotherapy. A total of 73 patients with ovarian cancer admitted to our hospital were enrolled and were randomly divided into group A (n=37) (managed with at-home cognitive behavioral therapy in nursing) and group B (n=36) (received conventional nursing based on chemotherapy). The nursing quality was compared in both groups. Scores of cancer-related fatigue, SAS and SDS in group A were lower than those in group B at 1 and 3 months after nursing; Scores of sleep quality in group A were lower than those in group B after 3 months of nursing; Scores of individual items, cardinal symptoms, overall function and general health in group A were superior to group B after 3 months of nursing ($P < 0.05$). At-home cognitive behavioral therapy combined with nursing intervention can significantly improve the recovery of ovarian cancer patients after chemotherapy.

Keywords: Ovarian cancer, chemotherapy, nursing, At-home cognitive behavior therapy, cancer-related fatigue, sleep quality, negative emotions

Introduction

Ovarian cancer, cervical cancer, and breast cancer are the three malignant tumor types of the female reproductive system. Advances in detecting techniques and increased examination rates give rise to an increase in the incidence of ovarian cancer [1, 2]. Less prominent early manifestations leads to more than half of the patients being in the middle and advanced stages at diagnosis, and thus are not well suited to surgical treatment but need chemotherapy [3].

Although chemotherapy may effectively kill tumor cells, it also kills healthy cells. Besides, the long period of treatment imposes pain on patients, not to mention the toxic and side effects associated with chemotherapy serious-

ly affect their quality of life [4, 5]. Cancer-related fatigue, which is common in cancer, expresses itself through physical symptoms and is also related to emotions, behaviors, and cognition. Long-term cancer-related fatigue further impacts the patient's sleep quality and life [6, 7]. Hence, for patients with ovarian cancer undergoing chemotherapy, it is necessary to support the development of nursing interventions in addition to feasible chemotherapy regimen. Some conventional nursing interventions may not show satisfactory outcomes due to patients' low awareness of the disease and also fear.

Cognitive behavioral therapy offers non-drug interventions that have been developed on the basis of cognitive therapy and behavioral theories. At-home cognitive behavioral therapy [8] has been widely used in various diseases but is

rare in ovarian cancer. In this study, 73 patients with ovarian cancer were enrolled to investigate the effects of at-home cognitive behavioral therapy combined with conventional nursing.

Material and methods

Subjects

A total of 73 patients with ovarian cancer admitted to our hospital during January 2018 - May 2019 were enrolled. They were given the same chemotherapy and were randomly divided into group B (n=36) and group A (n=37). Patients were informed of the details of the study and submitted a signed informed content of their own free will. The research in this paper was approved by the Ethics Committee of West China Second University Hospital, Sichuan University. (1) Inclusion criteria: patients who meets the diagnostic criteria for ovarian cancer [9]; were willing to receive chemotherapy; has normal hearing, vision, cognition and language expression, were included. (2) Exclusion criteria: patients who have distant metastasis or recurrence of tumors; are over 65 years old; had an expected survival of less than 3 months; had mental disorders; or other basic diseases affecting the study, were excluded.

Nursing methods

Patients in group B were given conventional nursing interventions in the light of chemotherapy; they were introduced to the considerations relating to chemotherapy such as methods and drugs, and managed with psychological counseling as well as health education.

Patients in group A were given at-home cognitive behavioral therapy combined with the conventional nursing in the light of chemotherapy: Cognitive Intervention: 1) Establish a harmonious nurse-patient relationship: Face-to-face communication with patients so as to identify any cognitive problems to be resolved or improved. Listen patiently to patients' complaints without any comments or judge to see the causes of negative emotions and/or misunderstandings. 2) Brochures: Brochures explained the causes of ovarian cancer, risk factors, disease types, characteristics of disease progression, and expected effects of chemotherapy, etc., in addition to more cognitive

knowledge that can have a positive impact on patient's mood and behavior. Brochures help patients consciously change their way of thinking, realize cognitive improvements, eliminate misunderstandings, and determine the source of wrong ways of thinking. 3) Cognitive notebook: A customized three-column notebook composed of modules in misunderstanding, cognition and its reconstruction and/or reorganization, and correct and positive cognition. It is used by the patients every day at home under the guidance of nursing staff that patients write any misunderstandings or negative moods during the chemotherapy in the left column, analysis of these misunderstandings in the middle column as well as the improved way of thinking in the right column. In this way, patients learn to use correct cognition instead of negative thinking. Nursing staff review the patient's notebook when they return to the hospital for chemotherapy, and answer their questions and assist with any doubts.

Behavioral interventions: 1) Exercise interventions: exercises include stairs climbing, walking, isometric contraction, etc., once a day for 10 minutes (then gradually extended to 20 or 30 minutes) for each. Note that there are 5 minutes of warm-up before exercise. With instructions to stop the exercise if there is an irregular heart rate, pain in lower extremities or nausea occurs. 2) Relaxation training: patients were told to lie down in a flat and comfortable position with their hands on both sides, the palms facing down, and eyes closed following a guided relaxation training audio that was played. Starting from the forearms and then moving to the face, neck, shoulders, back, chest, abdomen, and lower limbs, they were instructed to tighten the muscles and feel the tension for 10 seconds, and then relax; twice a day, 5-10 minutes each time. 3) Ideomotor: patients were learning Pranayama and asana rest following the audio and video, or learning Tai Chi. Light music or soothing music was also allowed for the exercise during which they keep a smooth and steady breath and the body relaxed. In a week, 3-4 exercises were designed, half an hour each.

Outcome measures

(1) Cancer-related fatigue: The revised Piper fatigue scale (RPFS) [10] was used for evaluation. The scale covered dimensions of behav-

ioral, emotion, sensory and cognition. Under each dimension, there were 6, 5, 5, and 6 items respectively. Each item was scored by visual simulation where 0 indicates none and 10 indicates quite severe. A dimensional score is derived by summing the scores of individual items. The higher the score is, the more serious cancer-related fatigue was.

(2) Depression: Self-rating Depression Scale (SDS) [11] was used to evaluate physical symptoms, depressive mood, psychomotor behavior and psychology through 20 questions, of which each was expressed (1-4 points) as never or rarely, sometimes, frequent, most or all the time. The total score was 20-80. A score of 50-59 suggested mild depression, 60-69 was moderate, and 70 or more was severe.

(3) Anxiety: Self-rating Anxiety Scale (SAS) [12] was used and it proposed 20 items including 4 reverse items (Reversely scored) and 16 positive ones. A total score of 50-59 suggested mild anxiety; 60-69 was moderate and 70 or above was severe.

(4) Sleep quality: Pittsburgh Sleep Quality Index (PSQI) [13] was applied to evaluate the incidence and type of sleep disorders within the past month. It includes a self-reported sleep scale covering 19 items. The evaluation can be summarized as the following dimensions: period of time required to fall asleep, duration of sleep, to what extent the sleep at night is affected, sleeping drugs used, daytime dysfunction, habitual sleep efficiency, and subjective sleep quality. Each item is scored 0-3 points. The total score was 0-21. The score is inversely proportional to sleep quality.

(5) Quality of life: EORTC QLQ-C30 scale [14] was used for evaluation and it includes 6 single items, 3 cardinal symptom modules, 5 functional modules, and 1 general health module. The 6 single items cover constipation, economic status, dyspnea, sleep disturbance, diarrhea, & loss of appetite. The 3 cardinal symptom modules cover pain, nausea, vomiting, & fatigue; the 5 functional modules assess the body, role function, emotion, cognition and society. There are 30 items in the scale. The first 28 items are scored 1-4 and the lower the better, while items 29 and 30 are scored 1-7 and the higher the better. The total score is 30-126.

Statistics

Statistical analysis was performed using SPSS 22.0. Measurement data were expressed as mean \pm standard deviation. Comparison between groups was subject to independent sample t test. Enumeration data were expressed using [n (%)]. Comparison between groups was subject to X^2 test. Intra-group comparisons were made using ANOVA and F test. $P < 0.05$ indicated a statistically significant difference.

Results

General data

There was little difference between the two groups in average age, body mass index (BMI), being married or non-married, pathological types, and surgical procedures ($P > 0.05$) (**Table 1**).

At-home cognitive behavioral therapy improves cancer-related fatigue

Before nursing interventions, the scores of behavioral, emotion, sensory and cognitive dimensions were (48.57 ± 6.93), (36.45 ± 5.12), (35.49 ± 5.33), & (49.87 ± 7.23) respectively, in group A; and (47.52 ± 7.12), (37.13 ± 5.16), (36.41 ± 5.29), & (50.27 ± 7.15) in group B. One month after nursing intervention, the individual scores above were (40.32 ± 5.42), (30.32 ± 3.46), (27.79 ± 4.61), (42.31 ± 5.19) in group A; and (45.24 ± 6.83), (36.85 ± 4.25), (33.31 ± 5.16) (48.72 ± 6.66) in group B. At 3 months after, the scores were (30.12 ± 4.18), (22.35 ± 4.68), (21.36 ± 3.57) (25.42 ± 4.66) in group A; and (34.61 ± 4.57), (28.64 ± 5.33), (25.31 ± 4.39), (30.82 ± 5.42) in group B. There was no significant difference in RPFS scores between the two groups before nursing ($P > 0.05$). At 1 and 3 months after the nursing, the scores decreased but the group A was significantly lower than group B ($P < 0.05$) (**Figure 1**).

At-home cognitive behavioral therapy improves depression

Before, and 1, 2, & 3 months after nursing intervention, SDS scores were (65.84 ± 7.52), (57.32 ± 6.34), (49.37 ± 4.16) & (40.31 ± 2.89) respectively, in group A; while they were (66.97 ± 7.59), (61.13 ± 4.83), (53.62 ± 5.45), and (45.34 ± 3.61) respectively, in group B. There

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Table 1. General data in both groups ($\bar{x} \pm s$)/[n (%)]

Items		Group A (n=37)	Group B (n=36)	t/ χ^2	P
Age (years)		58.64 \pm 13.82	60.23 \pm 15.78	0.458	0.648
BMI (kg/m ²)		23.16 \pm 1.85	23.51 \pm 1.92	0.793	0.430
Marital status	Married	29 (78.38)	26 (72.22)	0.372	0.542
	Unmarried	8 (21.62)	10 (27.78)		
Pathological pattern	Serous adenocarcinoma	10 (27.03)	11 (30.56)	0.528	0.134
	Mucoid adenocarcinoma	8 (21.62)	10 (27.78)		
	Clear cell carcinoma	9 (24.32)	7 (19.44)		
	Endometrioid adenocarcinoma	10 (27.03)	8 (22.22)		
Surgical method	Oophorectomy	7 (18.92)	6 (16.67)	0.639	0.357
	Adnexectomy	1 (2.70)	1 (2.78)		
	Radical resection of ovarian cancer	27 (72.97)	26 (72.2)		
	Hysterectomy	2 (5.41)	3 (8.33)		

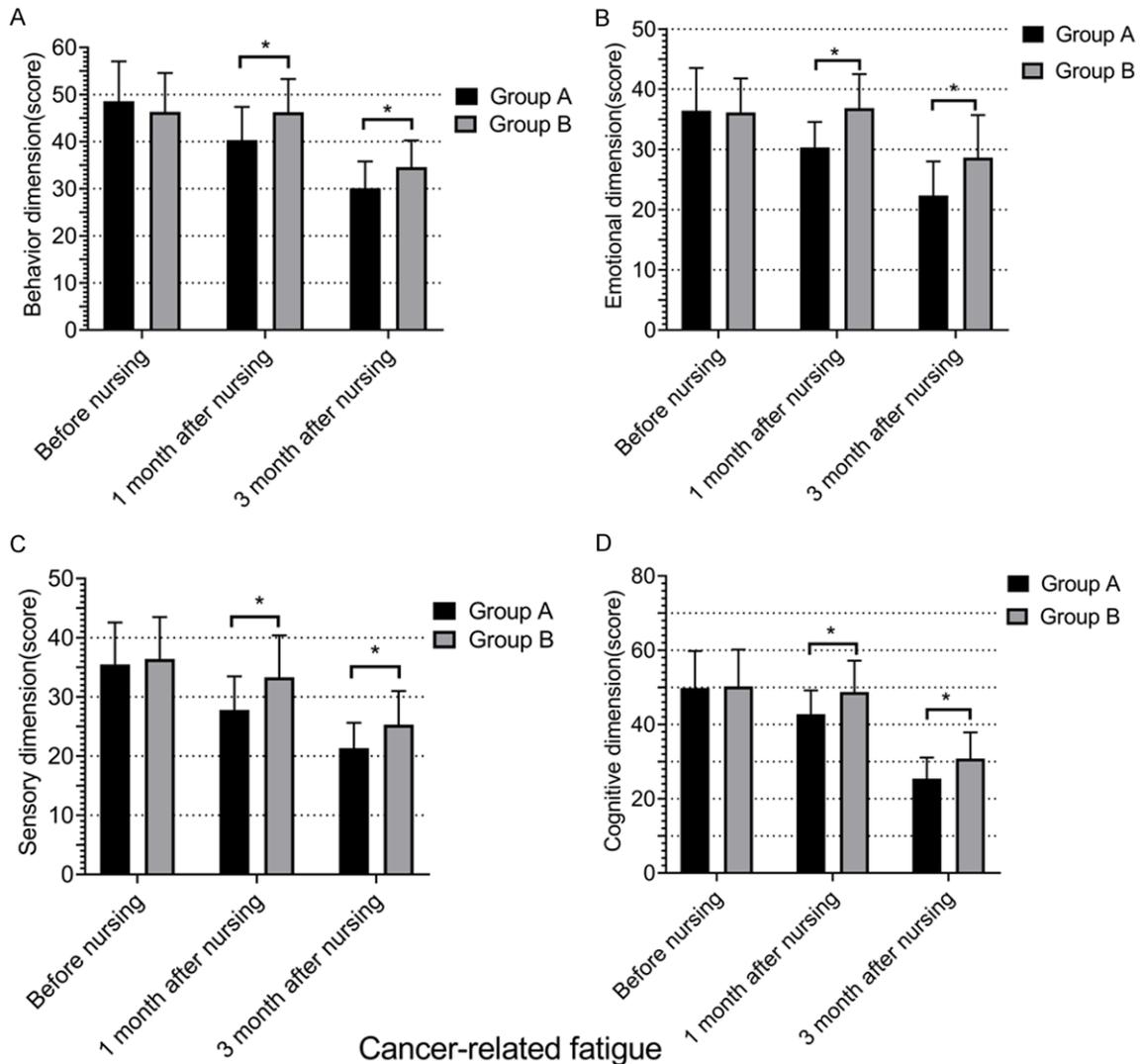


Figure 1. Cancer-related fatigue of patients in both groups. There was no significant difference in RPFS scores of behavioral, emotion, sensory and cognitive dimension between the two groups before nursing ($P > 0.05$). At 1 and 3 months after the nursing, the scores in group A were lower than those in group B ($P < 0.05$). *indicated $P < 0.05$.

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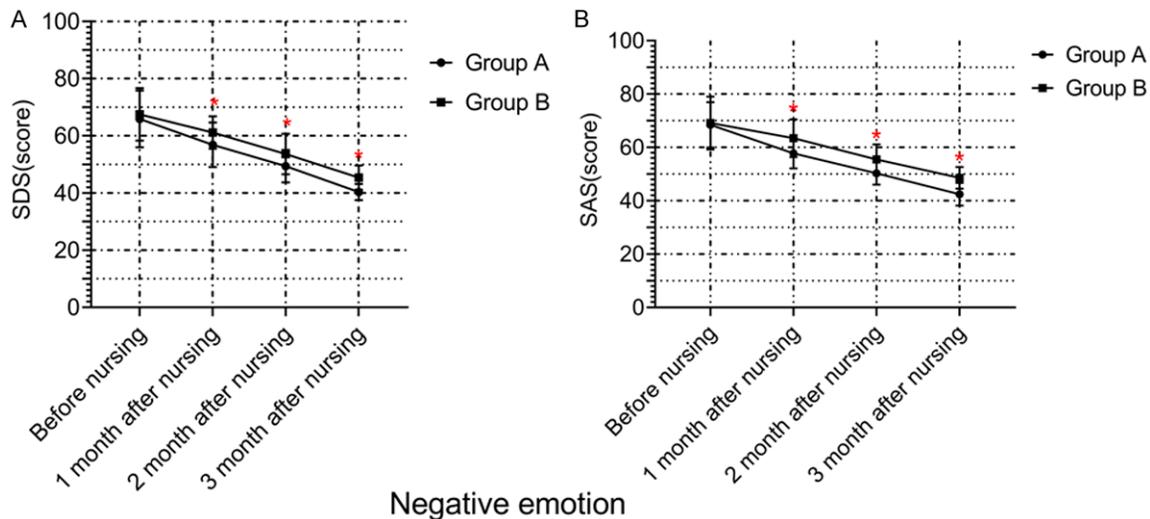


Figure 2. Negative emotions of patients in both groups. There were not significant differences between the two groups before nursing in SAS or SDS scores ($P > 0.05$). At 1, 2 and 3 months after nursing, the scores in group A were lower than those in group B ($P < 0.05$). *indicated $P < 0.05$.

was no significant difference in the depression scores between the two groups before nursing ($P > 0.05$). At 1, 2, & 3 months after nursing intervention, the scores decreased in both groups and those in group A were significantly lower ($P < 0.05$) (**Figure 2**).

At-home cognitive behavioral therapy improves anxiety

Before, and 1, 2, and 3 months after nursing intervention, SAS scores were (68.45 ± 6.92), (57.75 ± 4.13), (50.31 ± 3.95) and (42.45 ± 3.02) respectively, in group A; while they were (69.12 ± 7.23), (63.42 ± 5.29), (55.46 ± 4.24), and (48.72 ± 3.16) respectively, in group B. There was no significant difference in the anxiety scores between the two groups before nursing ($P > 0.05$). At 1, 2, & 3 months after nursing intervention, the scores decreased in both groups and those in group A were significantly lower ($P < 0.05$) (**Figure 2**).

At-home cognitive behavioral therapy improves sleep quality

Before intervention, scores in terms of period of time required to fall asleep, duration of sleep, sleep at night affected, daytime dysfunction, habitual sleep efficiency and subjective sleep quality were (2.10 ± 0.36), (2.16 ± 0.39), (2.32 ± 0.25), (2.36 ± 0.18), (2.27 ± 0.42), (2.30 ± 0.35) and (2.19 ± 0.26) respectively, in group A; and in group B the same were ($2.15 \pm$

0.40), (2.19 ± 0.42), (2.36 ± 0.29), (2.32 ± 0.21), (2.29 ± 0.44), (2.34 ± 0.38) and (2.23 ± 0.28). At 3 months after nursing, the individual scores in group A were (0.52 ± 0.13), (0.59 ± 0.15), (0.42 ± 0.17), (0.39 ± 0.21), (0.56 ± 0.18), (0.62 ± 0.21), and (0.63 ± 0.18); compared with group B they were (1.26 ± 0.32), (1.31 ± 0.36), (1.33 ± 0.39), (1.28 ± 0.24), (1.29 ± 0.31), (1.33 ± 0.25), and (1.34 ± 0.19). PSQI scores of the two groups before nursing were not significantly different ($P > 0.05$). At 3 months after nursing the scores of the two groups decreased and that in group A were significantly lower than that in group B ($P < 0.05$) (**Figure 3**).

At-home cognitive behavioral therapy improves quality of life

There were no significant differences in the scores of EORTC QLQ-C30 before nursing between the two groups ($P > 0.05$). At 3 months after nursing, scores of single items and cardinal symptoms in the two groups decreased but those of functional and general health increased, and the differences between group A and group B were statistically significant ($P < 0.05$) (**Table 2**).

Discussion

Cancer related fatigue in ovarian cancer is more prominent and causes physical and mental distress as well as even negative emotions

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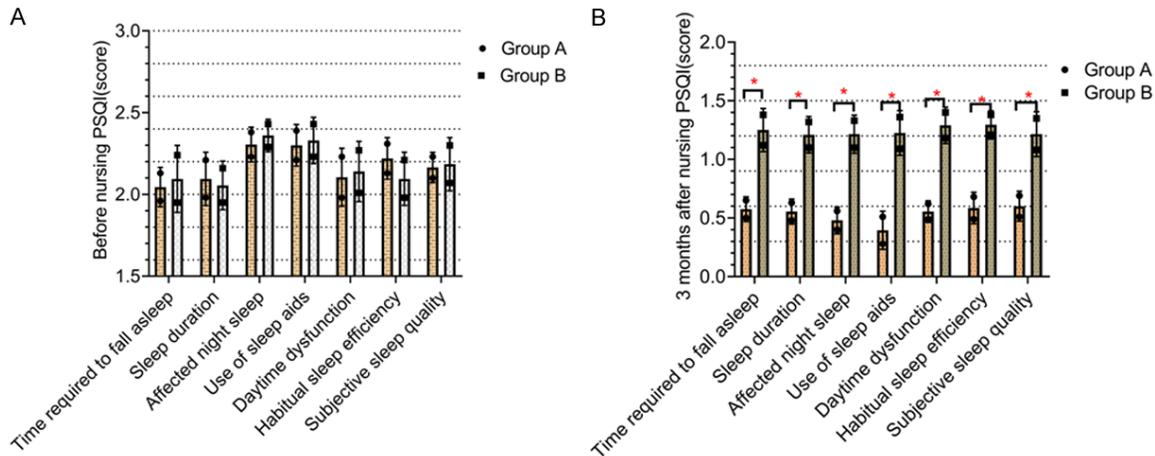


Figure 3. Sleep quality of patients in both groups. Before intervention, scores of the two groups in terms of period of time required to fall asleep, duration of sleep, sleep at night affected, sleeping drugs use, daytime dysfunction, habitual sleep efficiency and subjective sleep quality were not significantly different ($P > 0.05$). At 3 months after nursing the scores in group A were lower than those in group B ($P < 0.05$). *indicated $P < 0.05$.

Table 2. Quality of life of patients in both groups ($\bar{x} \pm s$, points)

Groups	Time	Single item	Cardinal symptoms	Functional	General health
A (n=37)	Pre-	16.25 ± 2.75	30.21 ± 2.49	13.65 ± 1.84	2.13 ± 1.16
	3 months after	7.13 ± 1.42*	10.16 ± 1.51*	45.12 ± 5.62*	4.85 ± 1.52*
B (n=36)	Pre-	16.58 ± 2.91	31.62 ± 3.02	14.85 ± 1.47	2.19 ± 1.21
	3 months after	10.42 ± 2.16*	13.56 ± 2.24*	38.94 ± 5.19*	3.62 ± 1.47*
T		7.710	7.623	4.878	3.513
P		0.002	0.003	0.007	0.001

Note: *t*, & *p* are the 3-month statistical values; * $P < 0.05$ as compared with the pre-.

[15]. Sleep disorders are considered to be an important cause of cancer-related fatigue, which in turn affects the quality of sleep and a vicious circle forms [7]. Medysky ME et al. [16] found that patients' sleep disorders were in direct proportion to the severity of the fatigue. This could be explained by the fact that patients with sleep problems have disordered excitatory-suppressive functions in the cerebral cortex, which weakens alertness; and besides, lack of sleep impacts the immunity making patients often feel dizzy, weak, and fatigued [17, 18]. For ovarian cancer patients, it is necessary to give active nursing interventions to reduce cancer-related fatigue and then improve emotional function, sleep quality, and therefore quality of life.

In this study, patients in group A were given at-home cognitive behavioral therapy combined with nursing and at 1, and 3 months after that the scores of behavior, emotion, sensation, and

cognitive dimension for cancer-related fatigue were significantly better than those in group B ($P < 0.05$), suggesting that at-home cognitive behavioral therapy reduced cancer-related fatigue as a result of the correct guidance by nursing staff by which the patients learned to deal with the disease in positive ways and had more knowledge of the disease to help them be more positive in coping with the disease and therefore improved the cancer-related fatigue [19]. Kwiatkowski F et al. [20] found that concerns about family relationships, living situation, and medical costs are common factors causing negative emotions and cancer-related fatigue in patients with ovarian cancer. Phelps C et al. [21] found that active nursing interventions that offer sufficient encouragement to patients are of great significance in reducing their negative emotions. In this paper, at 1-3 months after nursing, SAS and SDS scores in group A were lower to those in group B ($P < 0.05$), indicating at-home cognitive behavior

therapy in nursing more effectively controlled and reduced negative emotions of patients with ovarian cancer. This may be explained by the fact that the interventions and education by nursing staff from two major aspects of cognition and behavior, as well as guidance in terms of various detailed aspects lead the patients to a more accurate knowledge of the disease and chemotherapy, plus improved their self-care, achieving a relief of adverse emotions [22].

Beebe D et al. [23] have shown that the effects of intervention on sleep quality were significantly related to the intervention method, duration and details. In this study, scores of sleep quality and quality of life in group A after 3 months of nursing were superior to those in group B ($P < 0.05$), indicating that at-home cognitive behavior therapy significantly shortened the time required to fall asleep, extended the sleep duration, and improved daytime function. These in turn reduced sleep disorders. This could be the result of more attention paid by the nurses to patient's physiology and psychology in all aspects of effective psychological counseling, health education and other support, which as a whole guaranteed their compliance and confidence in treatment with relaxed state of mind. The decline in affecting factors further made patients sleep better at night and in the daytime be more positive towards life [24].

In summary, at-home cognitive behavioral therapy combined with nursing interventions for ovarian cancer patients after chemotherapy reduces negative emotions and cancer-related fatigue, as well as improves sleep quality and therefore quality of life. However, the small sample size, short period of time for follow-up, together with the lack of cases with metastasis and recurrence suggest that the results may be biased. Evaluation of the long-term effect of at-home cognitive behavior therapy has not yet occurred. Future studies shall focus on extensive research of larger samples so as to provide evidence for chemotherapy patients with ovarian cancer.

Disclosure of conflict of interest

None.

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