Original Article
The effects of solution-focused nursing on leukemia chemotherapy patients' moods, cancer-related fatigue, coping styles, self-efficacy, and quality of life

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Abstract: Objective: To explore the effects of solution-focused nursing on leukemia chemotherapy patients' moods, cancer-related fatigue, coping styles, self-efficacy, and quality of life. Methods: A total of 103 patients who underwent leukemia chemotherapy in our hospital were analyzed retrospectively and were divided into two groups based on the intervention method. Group A underwent routine nursing intervention, and group B underwent solution-focused nursing. The Hamilton Anxiety Rating Scale (HAMA) scores, the Montgomery-Asberg Depression Rating Scale (MADRS) scores, the Trait Coping Style Questionnaire (TCSQ) scores, the cancer-related fatigue self-rating scores, the General Self-Efficacy Scale (GSES) scores, and the Spitzer Quality of Life Index scores were compared between the two groups. Results: Compared with group A, group B had lower HAMA scores, lower MADRS scores, lower cognitive, behavioral, perception, and emotional scores, and higher self-efficacy scores ($P<0.05$). Group B had higher activity scores, and better psychological statuses, support from family and friends, health perception, and outlook on life than group A after the intervention ($P<0.05$). Conclusion: Solution-focused nursing can alleviate leukemia chemotherapy patients' negative emotions and cancer-related fatigue, improve their coping styles, and increase their self-efficacy and quality of life.

Keywords: Leukemia, solution-focused nursing, emotion, cancer-induced fatigue, coping style, self-efficacy, quality of life

Introduction

Clinically, leukemia is a common hematological malignancy characterized by a malignant clone of hematopoietic stem cells [1]. Due to uncontrolled cell proliferation, blocked apoptosis and disordered differentiation, the proliferation and accumulation of hematopoietic stem cells occur in hematopoietic tissues, invading other non-hematopoietic organs and tissues and inhibiting normal hematopoietic function [2]. The pathogenesis of leukemia is associated with various factors such as radiation, viruses, chemical stimulation, and genetics [3].

At present, chemotherapy is still the main option for the clinical treatment of leukemia [4]. Although chemotherapy can kill leukemia cells, it will also inevitably damage healthy organs and tissues [5, 6]. Negative emotions such as depression, fear, and anxiety are generally present in patients with leukemia, and patients with severe cases of the disease may have coping tendency disorders, which seriously affect the treatment effect, chemotherapy compliance, and quality of life [7, 8]. In addition, during the course of chemotherapy for leukemia, these negative emotions will have a negative impact on the patient's treatment compliance, seriously affecting the treatment efficacy as well as the patient's quality of life [9]. The benefits of chemotherapy depend not only on the chemotherapy regimen, but also on the psychological and physical statuses of the patients [10]. Once leukemia is diagnosed, it is easy to have negative emotions such as depression, anxiety and despair, and some patients are even resistant to treatment. Studies have shown that positive emotions can help improve cancer-related fatigue, coping styles, self-efficacy, and quality of life in leukemia patients [11, 12].

Routine nursing interventions have been usually carried out to care for patients with leukemia, focusing on the patients' physiological needs and paying less attention to their psychological needs, with a lack of initiative and pertinence. As a result, it is difficult to meet the patients' increasingly complex needs [13]. Solution-focused nursing is a scientific and standardized nursing model, which fully respects the individuals and guides them to fully mobilize their own potential and resources to actively participate in the process of behavioral change [14]. In recent years, the solution-focused nursing model has been widely used in clinical nursing at home and abroad and has obtained the ideal application effect. In order to improve leukemia patients' moods, cancer-related fatigue, and coping styles, this study used a solution-focused nursing model for the intervention. Unlike previous clinical studies, this innovative study comprehensively explores the effects of patients' moods, cancer-related fatigue, coping styles, self-efficacy, and quality of life.

Materials and methods

Clinical data

The clinical data of 103 patients who underwent leukemia chemotherapy in our hospital were analyzed retrospectively The patients were divided into two groups based on the intervention method, including 51 patients in group A who underwent routine nursing intervention and 52 patients in group B who underwent solution-focused nursing. (1) Inclusion criteria: patients who signed the informed consent, patients who met the Chinese guidelines for the diagnosis and treatment of acute lymphoblastic leukemia [15], patients with a survival period ≥ 6 months, patients were diagnosed using cell morphology and their symptoms and who were undergoing concurrent chemotherapy, patients without contraindications to chemotherapy; and patients with good compliance. This study was approved by the Medical Ethics Committee of Shanxi Provincial People's Hospital. (2) Exclusion criteria: patients who voluntarily withdrew their consent, patients who were also suffering from other life-threatening diseases, patients who also suffered from mental disorders, patients unable to communicate normally, patients with blood disorders, and pregnant and lactating patients.

Methods

Group A underwent routine nursing. The medical staff closely monitored the changes in each patient's condition, and strengthened the drug guidance, dietary guidance, health education, *etc*. They informed the patients of the importance and necessity of chemotherapy, and guided them in facing the disease with a positive and optimistic attitude.

Group B underwent solution-focused nursing.

Describe the problems. On the first day after admission, the nurses communicated face-to-face with the patients and their families, guided and encouraged the patients to openly express their inner thoughts and describe their physical and mental states, and they evaluated the severity of each patient's disease, cancer-related fatigue, and their coping styles, self-efficacy, quality of life, and emotions. By understanding the patients' internal doubts and concerns, the various problems encountered in the course of chemotherapy were improved to the greatest extent to promote a smooth completion of the course of chemotherapy.

Set goals. Within 1 week of admission, the nurses performed solution-focused conversations with full respect for each patient's autonomy. The patients were encouraged to describe their feelings in terms of cancer-related fatigue, coping styles, self-efficacy, and quality of life via open-ended and suggestive questions, and make clear their own health expectations. On basis of each patient's personality characteristics, highly feasible goals were formulated. Meanwhile, the patients were encouraged to imagine their mental states after the goal was achieved, strengthening their confidence in the chemotherapy and rehabilitation as well as their efforts towards this goal.

Exploring exceptions: After confirming their goals, the patients were encouraged to review the methods used in the past to solve the problems and the successes they had achieved, such as "Which activities can relieve cancer-related fatigue?" "Which type of music improves emotions?" "Which type of books can improve one's mental state?" "Which knowledge or method can improve one's self-efficacy?", *etc*., to explore the patients' potential and to increase their confidence in the chemotherapy.

Provide feedback: After a week of intervention, the cancer-related fatigue, the coping styles, self-efficacy, quality of life, and moods were evaluated again to affirm the patients' efforts. As to the indicators with no significant changes, the causes were identified, and the errors were corrected promptly, or the targets were adjusted to maximize the mobilization of patient participation and subjective initiative.

Evaluation: The evaluation was carried out throughout the intervention process, with a frequency of about 1 time/week. Each evaluation cycle was controlled to last between 20-30 min. The nurses could set specific targets, such as a score of 28 points for positive actions, guess how many points you got this week? When the patient's guessed score reached the expected goal or if the patient gave a positive response, the medical staff immediately praised or affirmed the patient, and emphasized to the patient the standardization of the chemotherapy procedure, set a new goal with the patient, summarized the successful experience of the previous stage, and worked towards the disease reversion that we desired.

Observation indicators

The following indicators were evaluated before and after the intervention (1) the Hamilton Anxiety Rating Scale (HAMA) scores [16]: HAMA was used to evaluate the anxiety of the two groups. It contains 14 items, which can be summarized as the psychological anxiety factor and the physical anxiety factor. Each item is scored on a scale of 0 (not present) to 4 (severe). Scores ≤7 points indicates the absence of anxiety, 21-28 points indicates significant anxiety, and ≥ 29 points indicates severe anxiety. (2) The Montgomery-Asberg Depression Rating Scale (MADRS) scores [17]: The MADRS was used to evaluate the patients' depression on a scale of 0-6 and covers 10 items. Scores <12 points indicate a remission period, 12-22 points indicates mild depression, 23-30 points indicates moderate depression, 31-35 points indicates severe depression, and >35 points indicates extreme depression. (3) Coping style [18]: The Trait Coping Style Questionnaire (TCSQ) was used to evaluate the patients' coping styles, consisting of 13 negative items and 13 positive items. Each item was scored on 1-5 point scale. The coping style was determined

using the total scores. (4) Cancer-induced fatigue [19]: The cancer-induced fatigue was evaluated using the cancer-related fatigue self-rating scale, covering four dimensions: cognition, behavior, perception, and emotion. 22 items were evaluated on a scale of 0-10 points, and the severity of the fatigue symptoms was proportional to the scores. (5) Self-efficacy [20]: The General Self-Efficacy Scale (GSES) was used to evaluate the self-efficacy, with 10 items, all of which were scored from 1-4 points. The self-efficacy was directly proportional to the scores. (6) Quality of life [21]: The Spitzer scale was used to evaluate the quality of life of the two groups in terms of their activity abilities, their psychological statuses, the supports from their families and friends, their health statuses and outlooks on life with a total of 10 points. The patients' quality of life was proportional to the scores.

Statistical analysis

Using SPSS 22.0, the measurement data were expressed as the mean ± standard deviation (mean ± SD). Data that met a normal distribution were subjected to t tests, and if it was not met, Mann-Whitney U tests were used. The count data were expressed as [n (%)], and X^2 tests were used to compare the inter-counting data. $P<0.05$ indicated statistical significance.

Results

Comparison of the baseline data

The Sex ratio, age, disease type, and educational level had no significant differences between the two groups ($P>0.05$) (**Table 1**).

Comparison of HAMA scores

There were no significant differences in the HAMA scores before the intervention ($P>0.05$). Compared with before the intervention, the both groups' HAMA scores were lower after the intervention, with a more significant reduction in group B than in group A ($P<0.05$) (**Table 2**).

Comparison of the MADRS scores

The MADRS scores showed no significant differences between the two groups before the

Table 1. Comparison of the baseline data [n (%)]/($\overline{x} \pm s$)

Data		Group A (n=51)	Group B (n=52)	t/X^2	P
Gender (cases)	Male	39 (76.47)	37 (71.15)	0.376	0.539
	Female	12 (23.53)	15 (28.85)		
Age (years)		42.28±1.09	42.32±1.02	0.192	0.848
Disease type					
Acute leukemia		28 (54.91)	30 (57.69)	0.082	0.775
Chronic leukemia		23 (45.10)	22 (42.31)		
Education level					
Junior high school and below		19 (37.25)	17 (32.69)	0.018	1.598
High school		22 (43.14)	24 (46.15)		
College and above		10 (19.61)	11 (21.15)		

Table 2. Comparison of the HAMA scores ($\overline{x} \pm s$, points)

Group	Before intervention	After intervention
Group A (n=51)	34.58±3.08	29.12±2.18[#]
Group B (n=52)	34.62±3.05	15.12±1.09[#,*]
t	0.066	41.342
P	0.947	0.000

Note: [#]indicates a comparison with before the intervention, $P<0.05$; [*]indicates a comparison with group A, $P<0.05$.

Table 3. Comparison of the MADRS scores ($\overline{x} \pm s$, points)

Group	Before intervention	After intervention
Group A (n=51)	36.02±1.08	34.15±0.58[#]
Group B (n=52)	36.11±1.02	28.15±1.28[#,*]
t	0.435	30.540
P	0.665	0.000

Note: [#]indicates a comparison with before intervention, $P<0.05$; [*]indicates a comparison with group A, $P<0.05$.

intervention ($P>0.05$) and were lower in both groups after the intervention ($P<0.05$). The MADRS scores in B group were lower in than the MADRS scores in group A ($P<0.05$) (**Table 3**).

Comparison of the TCSQ scores

There was no significant difference in the positive and negative coping scores before the intervention ($P>0.05$). These scores were improved after the nursing intervention ($P<0.05$). Compared with group A, group B had lower negative coping scores and higher positive coping scores ($P<0.05$) (**Figure 1**).

Comparison of the cancer-induced fatigue scores

There was no significant difference between the two groups in their cancer-induced fatigue scores before the intervention ($P>0.05$). These scores were lower in both groups after the intervention ($P<0.05$) and they were lower in group B than in group A ($P<0.05$) (**Figure 2**).

Comparison of the self-efficacy scores

There was no significant difference in the self-efficacy scores between the two groups of patients before the intervention ($P>0.05$). Compared with before the intervention, the self-efficacy scores of the two groups were improved after the intervention ($P<0.05$). Compared with group A, the self-efficacy scores were higher in group B after the intervention ($P<0.05$) (**Table 4**).

Comparison of the quality of life scores in the two groups

Compared with before the intervention, the quality of life scores in terms of the activity capacity, psychological status, support of family and friends, and outlook on life were improved in both groups after the intervention ($P<0.05$). The scores in group B were higher than the scores in group A ($P<0.05$) (**Figure 3**).

Discussion

Environmental pollutants increase the risk of leukemia worldwide [22]. Chemotherapy is the primary option for treating leukemia. It prolongs the survival period but also has a series of
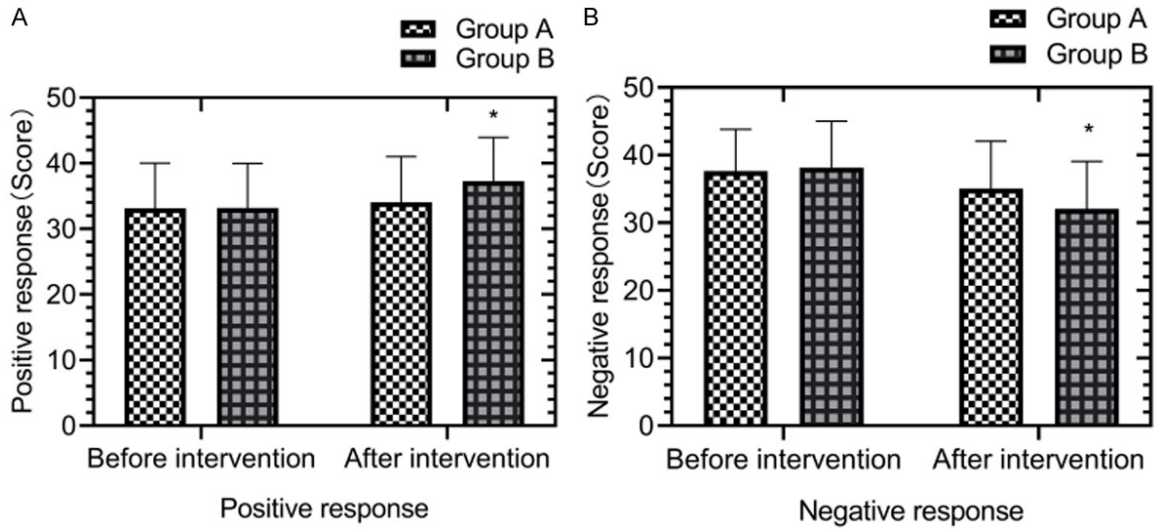
Figure 1. Comparison of the TCSQ scores in the two groups. A: Positive coping scores. B: Negative coping scores. *Compared with group A, *P*<0.05.
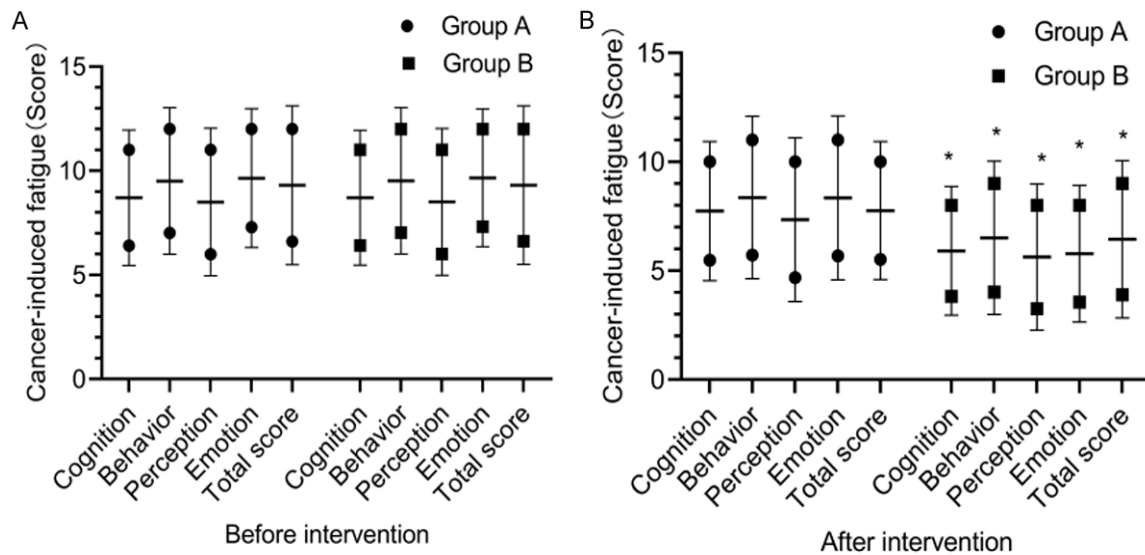

Figure 2. Comparison of the cancer-related fatigue scores in the two groups. A: Before the intervention; B: After the intervention, *P*<0.05. *Compared with group A, *P*<0.05.

Table 4. Comparison of the self-efficacy scores ($\bar{x}$ ± s, points)

Group	Before intervention	After intervention
Group A (n=51)	17.15±1.22	22.15±2.28[#]
Group B (n=52)	17.19±1.19	30.18±3.29[#,*]
t	0.168	14.371
P	0.867	0.000

Note: [#]indicates a comparison with the scores before the intervention, *P*<0.05; [*]indicates a comparison with group A, *P*<0.05.

adverse effects on the patient's body and mind [23]. Therefore, scientific and rational nursing interventions can be implemented to minimize the negative impacts of chemotherapy on patients with leukemia and improve their quality of life [24].

In the routine nursing model, the medical staff calmly explain the disease and share chemotherapy-related knowledge with the patients. They do not focus on inspiring the patients' sub-
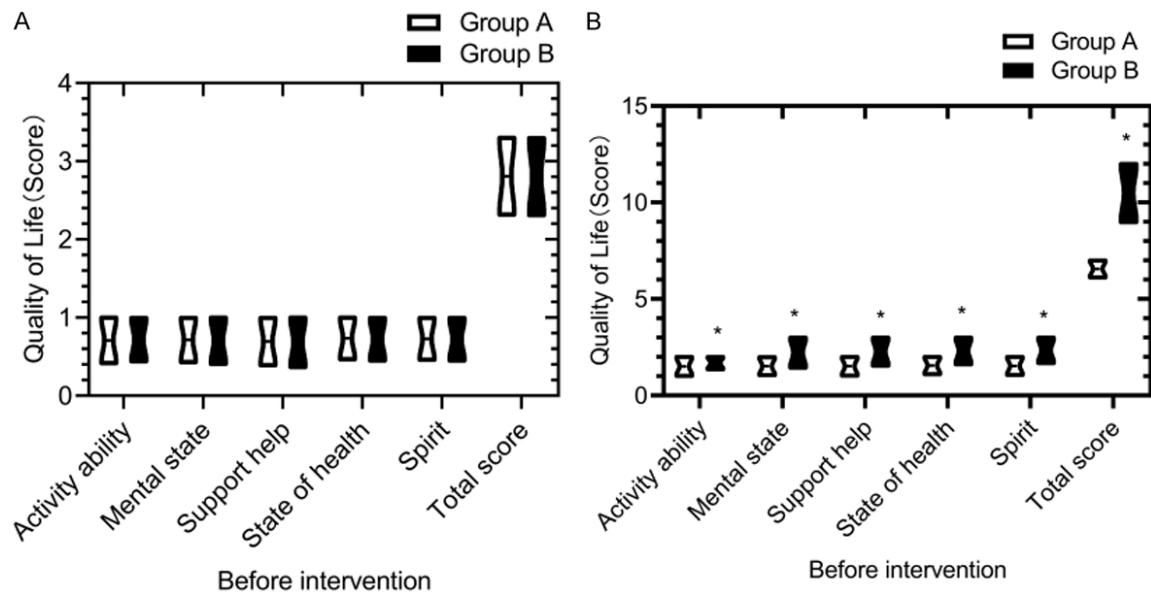
Figure 3. Comparison of the quality of life scores in the two groups. A: Before the intervention, *P*>0.05; B: After the intervention, *P*<0.05. *Compared with group A, *P*<0.05.

jective initiatives. Although they can improve the patients' awareness of the disease, they often neglect their self-care and self-efficacy. The patients are prone to experience a variety of negative emotions, such as fear, anxiety, and depression, wreaking havoc on their quality of life [25]. In this study, the HAMA and MADRS scores in group B were lower than the corresponding scores in group A after the intervention (*P*<0.05), suggesting that solution-focused nursing is conducive to reducing the anxiety and depression levels. Solution-focused work has its origins within psychological approaches. It emerged in the 1970s, influenced by the work of key psychologists at the time. Questions which are solution-orientated are employed to help the person perceive what is working in their life rather than what isn't. This enables the service user and the worker to focus on how solutions are developed and constructed, therefore creating positive changes. By describing the problems, setting goals, exploring exceptions, giving feedback and evaluation, this nursing model guides the patients to solve problems during nursing and chemotherapy, affirms the patient's efforts promptly, provides positive support feedback for them to reduce the negative emotions such as anxiety and depression and encourages patients to work towards the goals set in advance to increase their confidence in the recovery [26].

Second, the results of this study also showed that the negative coping scores in group B were lower, and the positive coping scores and self-efficacy scores were higher than those of group A (*P*<0.05), suggesting that solution-focused nursing is beneficial to improving a patient's coping style and self-efficacy. This model focuses on inspiring patients to mobilize their initiative and enthusiasm, fully tap their potential, and increase their participation, so that problems in the treatment process can be effectively improved. With a solution focused model, leukemia patients exhibited a significantly higher subjective initiatives and adopted positive coping styles and behavior patterns, facilitating the successful completion of chemotherapy, and their sense of self-efficacy was also enhanced [27]. Cancer treatments such as chemotherapy, radiation therapy, and biologic therapy can cause fatigue in cancer patients. Fatigue is also a common symptom of some types of cancer. Patients describe fatigue as feeling tired, weak, worn-out, heavy, slow, or that they have no energy or get-up-and-go. Patients with leukemia are affected by the disease itself and the chemotherapy and have a high risk of cancer-induced fatigue. In this study, the cognition, behavior, perception, emotion, and cancer-related fatigue scores in group B were all lower than the corresponding scores in group A after the intervention. The activity

ability, psychological status, support from family and friends, health status, outlook on life, and quality of life scores in group B were higher than the corresponding scores in group A, suggesting that solution-focused nursing can decrease the cancer-related fatigue level and improve the quality of life. The study of Lv [28] also found that the cognition, behavior, perception, emotion, and cancer-induced fatigue scores in the intervention group with the solution-focused nursing were all lower than the corresponding scores in the conventional nursing group after the intervention, which is highly consistent with the results of this study and further proves the effectiveness of the solution-focused nursing model in leukemia nursing. The reason may be that solution-focused nursing makes full use of the patient's individual condition, analyzes the specific causes of cancer-related fatigue, and formulates targeted nursing programs to reduce depression, anxiety, and other negative emotions, thus reducing the cancer-related fatigue caused by the psychological factors and improving the quality of life.

To sum up, the solution-focused nursing model is beneficial for alleviating negative emotions and cancer-related fatigue, improving coping styles, and improving self-efficacy and quality of life in leukemia patients.

This study has some shortcomings, such as its small sample size and short follow up time, so more comprehensive research is needed in the future.

Disclosure of conflict of interest

None.

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