



Effects of Positive Mental Nursing on the Post-Traumatic Growth, Negative Emotions, and Coping Style of Patients after Chemotherapy for Leukemia

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Abstract

Background: Patients with leukemia easily develop negative emotions, such as anxiety and depression, during their treatment. To improve the available mental intervention measures for patients with tumors, we explored the influences of mental nursing based on Rosenthal effect on the post-traumatic growth, negative emotions, and coping style of patients after undergoing chemotherapy for leukemia.

Methods: A total of 90 patients who underwent chemotherapy for leukemia in The First Affiliated Hospital of Suzhou University from January 2019 to December 2020 were selected. They were randomly divided into the control group ($n=45$) and observation group ($n=45$). Patients in the observation group received mental nursing based on Rosenthal effect. The post-traumatic growth, negative emotions, and coping styles of these two groups were assessed using the Post-Traumatic Growth Inventory (PTGI), Self-Rating Anxiety Scale (SAS), Self-Rating Depression Scale (SDS), and Medical Coping Modes Questionnaire (MCMQ).

Results: After the intervention, patients in the observation group show higher scores in the dimensions of reflections on life, individual power, new possibilities, and self-transformation in PTGI, and their total scores are overall higher than those of the control group. The observation group also receive lower scores in SAS and SDS compared with the control group. While the observation group also receive significantly higher scores in some dimensions in MCMQ compared with the control group, the former received significantly lower scores in retreating and succumbing.

Conclusion: Mental nursing based on Rosenthal effect can positively promote the physical and psychological health of patients after receiving chemotherapy for leukemia.

Keywords: Leukemia; Post-traumatic growth; Negative emotions; Coping style; Rosenthal effect; Mental intervention

Introduction

Leukemia is a hematological malignant tumor caused by anomalies in hematopoietic stem cells. A total of 437,033 new cases of leukemia and 309,006 leukemia-related deaths were reported

worldwide in 2018. In China, leukemia has an incidence rate of 5.68/100,000, and the associated economic burden is continuously intensifying (1-2). However, with an improving medical level,



the survival rate of patients with leukemia has improved significantly. Therefore, survival quality has become a key concern in clinics. The currently available treatment for leukemia still focuses on chemotherapy, which can achieve the first-remission rate of acute leukemia of as high as 60% to 70% and ensure at least 5 years of disease-free survival (DFS) for about 1/5 of leukemia patients (3). However, patients experience complex psychological processes from their morbidity to diagnosis. Together with the long period, huge economic cost, toxicity and side effects, and prognosis uncertainty of chemotherapy, patients suffer interweaving physical and mental pains, which can bring them physical and mental trauma and subsequently change their emotions, cognitions, and behaviors and even lead to negative emotions, such as anxiety and depression(4).

Mental pains are closely related to depression and anxiety and can influence patients' ability to deal with diseases effectively, thereby influencing the prognosis of their treatment (5). Addressing such negative emotions has an important role in improving prognosis. Positive psychology has been recently introduced as a new concept in social psychological service system construction. Accordingly, building mental intervention methods based on theories related to positive psychology has become a hotspot among researchers trying to design effective clinical interventions for patients.

As the current medical mode shifts to a biology-psychology-society multi-level and multi-dimensional mode, the psychological health problems of patients have become considered major social problems. Many scholars have examined the psychological health problems of patients with leukemia. Mental intervention can improve the psychological state and subjective well-being of patients after receiving chemotherapy for leukemia (6). The currently available intervention methods mainly include cognitive-behavioral intervention, emotional therapy, and humanistic care, all of which are developed to address negative emotions. However, previous studies have

rarely explored the positive emotions and behaviors of patients.

With respect to the psychological health problems of patients with tumors such as leukemia, many scholars have studied mental intervention from the perspective of traditional psychology. Incentive psychotherapy can improve the negative emotions and quality of life of patients after receiving chemotherapy for leukemia (7). Ellis et al. (8) relieved the psychological pains and negative emotions of patients effectively through cognitive behavioral therapy and subsequently improved their quality of life. Yang et al. (9) not only improved the psychological state of patients and relieved their fatigue by empathy nursing but also increased their feelings of hopefulness. These studies all focused on relieving negative emotions caused by diseases yet largely ignored the potential influences of the positive emotions of patients.

The Rosenthal effect focuses on the psychological feelings of patients and improves their negative emotions through trust, encouragement, praise, and affirmation with an aim to strengthen their confidence in beating their disease and improve their prognosis (10). The Rosenthal effect can improve the negative emotions and reduce post-operation complications among patients with colon cancer (11). The nursing intervention based on Rosenthal effect can improve the symptoms of patients with depression (12). In sum, the Rosenthal effect has important application values in the psychological intervention of patients.

The current clinical interventions against the negative emotions of patients with leukemia mainly include health education and psychological counseling. However, these interventions only have limited effects. Providing mental intervention to patients based on positive psychological theories to relieve their negative emotions is critical to improving their quality of life. The Rosenthal effect boosts the confidence of patients by offering psychological suggestions, such as praise, trust, and expectation. This intervention has been proven to have a positive effect on the psychological health of patients. When proven to relieve

negative emotions, the Rosenthal effect can greatly benefit patients with leukemia.

Accordingly, a mental intervention based on Rosenthal effect in this study was implemented among patients receiving chemotherapy for leukemia with an aim to determine its influences on their post-traumatic growth, negative emotions, and coping style. The conclusions of this study can provide some references for the mental intervention of patients with leukemia.

Methods

Research objects

A total of 90 patients who received chemotherapy for leukemia in The First Affiliated Hospital of Soochow University, Suzhou, China from January 2019 to December 2020 were selected via convenient sampling. Only those patients who were 1) diagnosed with leukemia and received

chemotherapy; 2) aged 18 to 70 years; 3) have no serious complications influencing their vital signs; 4) have normal cognitions and communication ability; 5) signed informed consent were included in the sample. Meanwhile, those patients who demonstrated complications associated with 1) other hematological system diseases; 2) other tumors; 3) serious physical diseases; 4) heart, liver, and kidney dysfunction; 5) mental diseases were excluded. The selected patients were randomly divided into the control ($n=45$) and observation groups ($n=45$) using a random digital table. To avoid pollution, patients from these two groups were assigned towards A and B, respectively. These two groups were in equilibrium and were comparable in terms of general data ($P>0.05$, Table 1).

This study was approved by the Ethics Committee of The First Affiliated Hospital of Suzhou University.

Table 1: Comparison of the general information of the two groups

Groups	Gender (male/female, cases)	Age ($\bar{x} \pm s$, years)	Disease type (Acute lymphocytic leukemia/acute myeloid leukemia/ others, cases)	Education (high school or lower/universities or higher, cases)	Address (rural/urban, cases)	Monthly household income (<3000/3000 - 5000/>5000 CNY, cases)
Observation group (n=45)	24/21	36.14±10.68	18/20/7	19/26	22/23	8/27/10
Control group (n=45)	20/25	35.74±11.23	20/19/6	17/28	21/24	10/24/11
t/ χ^2 value	0.711	0.173	0.208	0.185	0.045	0.446
P value	0.399	0.863	0.901	0.667	0.833	0.800

Establishing the Rosenthal mental intervention team

The mental intervention team comprised six nursing staff who received knowledge training related to Rosenthal effect and psychological counseling quality. The deputy director of the

hospital's nursing department, who is also a national level-2 psychological counselor, assumed the role of a team leader responsible for guiding the scheme design and for coordinating the activities. Meanwhile, the deputy director of quality control from the same department designed the

activity scheme and was assigned as the activity team leader and contact person. A head nurse from the hematology department and three professional nurses implemented the intervention program. Before the intervention, the team leader provided all members with knowledge training on positive psychology, Rosenthal effect theory, implementation method, skills, sending of scales, and filling notes to ensure that all these members master the applications and skills of mental intervention based on Rosenthal effect.

Mental intervention based on Rosenthal effect

All team members understand the psychological needs, negative emotion sources, and specific factors that influence the emotions of patients through communication. Encouraging slogans, such as “Keep a good mentality” and “Defeat the disease,” were hung around the ward and mindful decompression audio was played to provide emotional support (similar to care and encouragement from families and friends) to patients through modern communication means and to promote a positive humanistic environment in the ward.

The philosophy of Rosenthal effect was integrated into emotion management to strengthen the patients’ cognition of leukemia, change their negative attitudes, and adjust their emotions.

1) Hope and expectation. After teaching patients about the clinical manifestations, therapy, and prognosis of leukemia, the head nurse and nurse-in-charge helped them develop an accurate understanding of the disease and provided some encouragement. By citing cases of successful treatments, they helped build the confidence of these patients in fighting their disease and in setting expectations related to their treatment.

2) Action and feelings. The nurse-in-charge approached the patients, listened to their concerns, created an atmosphere conducive for them to release their negative emotions, and eliminated their fears and sense of helplessness through eye contact and body language, such as patting their shoulders. The nurse-in-charge also helped these patients undergo relaxation training. First, these patients were asked to close their eyes and focus

on their internal emotions. Second, they were asked to imagine a future with a relaxed, confident, and approved belief. Third, they were asked to share their internal emotions. Throughout this process, the team members recorded the feelings and emotional changes among patients and provided them affirmation, praise, and encouragement while they were sharing their internal emotions.

3) Acceptance and internalization. Guided by the team members, the patients engaged in positive “self-conversations” via the self-incentive method. Specifically, they told themselves “I’m doing well!” as a confirmation of their efforts and progress in complying with their treatments, taking regular meals, drinking water, and getting enough sleep. These patients could also read books, listen to music, or watch inspirational plays to enjoy their time alone and temporarily forget about their disease. Positive “self-conversion” was employed as a psychological suggestion method. First, the patients took a deep breath, maintained a relaxed state, and expressed their feelings through positive self-conversion. For example, they controlled their negative emotions by saying “I feel happy... because...,” “I’m happy to accept...,” and “I can defeat...,” which can help them overcome their fears about their disease and establish their confidence.

4) Information feedback. The team regularly assessed the psychological states of patients, provided them psychological counseling according to their emotional state, and asked their families to provide the corresponding emotional support. The team members also learned new theoretical knowledge and application cases according to their understanding of the Rosenthal effect to update the old intervention concept and improve their intervention level through continuous learning and practices.

Implementation of the intervention

The patients began receiving mental intervention on the second day of their hospitalization. The intervention was delivered once a day, with each session lasting 20 to 30 min. The control group received conventional mental interventions, in-

cluding empathy, comfort, Q&A, and distraction, whereas the observation group received one-to-one positive mental interventions based on the Rosenthal effect in addition to the same conventional mental interventions delivered to the control group. The intervention for the observation group was delivered twice a week, with each session lasting 30 to 40 min.

Quality control

1) Research design stage: The team members searched for previous studies on positive psychology, designed intervention programs according to the psychological characteristics of patients with leukemia, and then revised these programs according to the opinions of relevant experts. After the cognition pre-test, the details of the program were modified in consideration of the problems that emerged in the process.

2) Intervention implementation stage: The intervention team members mastered the intervention methods and skills through relevant training. To avoid contamination, the two groups were assigned to different wards with the consent of patients.

3) Data acquisition stage: A unified filling guideline was used, and all questionnaires were filled by patients. The data collectors stood aside and helped the patients answer the questionnaire throughout the process. After completing the questionnaires, the quality of filling was evaluated in time. The team members asked the patients about their accurate intentions in case of multiple choices for a single item and missing answers.

Evaluation indexes

The post-traumatic growth levels of the two groups were assessed using the post-traumatic growth inventory (PTGI) (13), which includes 20 items divided into 5 dimensions, including reflections on life, individual power, new possibilities, social relations, and self-transformation. Each item was rated on a Likert-type scale with scores ranging from 0 (“no”) to 5 (“very much”). The total score ranges from 0 to 100, with a higher score indicating a higher post-traumatic growth

level. This scale had a Cronbach’s α of 0.87 and construct validity of 0.86.

The Self-Rating Anxiety Scale (SAS) (14) and Self-Rating Depression Scale (SDS) (15) compiled by Zung were used to assess the anxiety and depression state of both groups. Each of these instruments contains 20 items rated on a 3-level Likert-type scale. Specifically, SAS scores of <50, 50–59, 60–69, and ≥ 70 indicate normal, mild, moderate, and severe anxiety, respectively. Meanwhile, SDS scores of <53, 53–62, 63–72, and ≥ 73 indicate normal, mild, moderate, and severe depression, respectively. SAS and SDS had Cronbach’s α of 0.87 and 0.85 and remeasurement coefficients of 0.81 and 0.80, respectively.

The Medical Coping Modes Questionnaire (MCMQ) (16) was used to assess the coping style of the two groups. This scale contains 20 items divided into 3 categories, namely, facing (8 items), retreating (7 items), and succumbing (5 items). Each item was scored from 1 to 4, with higher scores indicating that the patients are more apt to the relevant coping style. These three dimensions had Cronbach’s α of 0.64, 0.85, and 0.67, respectively.

Statistical method

The data were analyzed and processed using SPSS 24.0 (IBM Corp., Armonk, NY, USA). The measurement data (following normal distribution) were described in ($\bar{x} \pm s$), and pairwise *t*-test (inter-group comparison) or *t*-test (inter-group comparison) was carried out. The enumeration data (cases (%)) were evaluated by conducting a χ^2 -test. $P < 0.05$ indicates statistical significance.

Results

Comparison of the post-traumatic growth scores of two groups before and after the intervention

Before the intervention, the observation and control groups did not show any statistically significant differences in their total PTGI score and their scores for each dimension ($P > 0.05$). However, after the intervention, the scores of both

groups increased significantly. The scores obtained by the observation group for reflections on life and individual power, new possibilities, self-transformation, and the entire scale were sig-

nificantly higher than those obtained by the control group ($P<0.05$). Results are shown in Table 2.

Table 2: Comparison of the post-traumatic growth scores of the two groups before and after the intervention ($\bar{x} \pm s$, scores)

Groups	Timepoints	Reflections on life	Individual power	New possibilities	Social relations	Self-transformation	Total PTGI
Observation group (n=45)	Before	15.68±2.14	7.48±1.62	7.67±1.52	7.65±1.84	7.84±1.65	46.32±5.47
	After	20.24±2.41 ^{ab}	8.79±1.41 ^{ab}	8.89±1.41 ^{ab}	8.32±1.21 ^a	9.78±2.23 ^{ab}	56.02±4.65 ^{ab}
Control group (n=45)	Before	15.76±2.23	7.41±1.54	7.61±1.63	7.58±1.74	7.79±1.62	46.15±5.21
	After	18.14±2.29 ^a	8.16±1.38 ^a	8.25±1.55 ^a	8.27±1.59 ^a	8.64±2.08 ^a	51.6±5.73 ^a

Notes: Compared with the situation before the intervention, ^a $P<0.05$. Compared with the control group, ^b $P<0.05$.

Comparison of the SAS and SDS scores of the two groups before and after the intervention

Before the intervention, the observation and control groups did not show any statistically significant differences in their SAS and SDS scores

($P>0.05$). After the intervention, the SAS and SDS scores of these two groups significantly decreased ($P<0.05$). The SAS and SDS scores of the observation group were significantly lower than those of the control group ($P<0.05$) (Table 3).

Table 3: Comparison of the SAS and SDS scores of the two groups before and after the intervention ($\bar{x} \pm s$, scores)

Groups	Timepoints	SAS	SDS
Observation group (n=45)	Before	56.24±8.76	58.37±8.64
	After	45.12±6.12 ^{ab}	47.31±6.52 ^{ab}
Control group (n=45)	Before	56.68±8.38	58.42±8.79
	After	48.68±6.35 ^a	53.14±6.89 ^a

Notes: Compared with the situation before the intervention, ^a $P<0.05$. Compared with the control group, ^b $P<0.05$

Comparison of the coping style scores of the two groups before and after the intervention

Before the intervention, the observation and control groups did not show any statistically significant differences across various dimensions of MCMQ ($P>0.05$). After the intervention, their facing scores in MCMQ increased significantly

($P<0.05$), whereas their retreating and succumbing scores gradually decreased ($P<0.05$). The facing scores of the observation group were significantly higher than those of the control group ($P<0.05$), but the opposite was observed for their retreating and succumbing scores (Table 4).

Table 4: Comparison of the coping style scores of the two groups before and after the intervention ($\bar{x} \pm s$, scores)

Groups	Timepoints	Facing	Retreating	Succumbing
Observation group (n=45)	Before	12.57±2.89	18.41±2.72	13.86±2.61
	After	16.71±3.25 ^{ab}	15.41±3.08 ^{ab}	10.06±2.47 ^{ab}
Control group (n=45)	Before	12.78±3.11	18.68±2.89	14.11±2.78
	After	14.48±3.08 ^a	17.49±2.68 ^a	12.65±2.89 ^a

Notes: Compared with the situation before the intervention, ^a $P<0.05$. Compared with the control group, ^b $P<0.05$

Discussion

Table 2 shows that the total PTGI score of the observation group increased from (56.02 ± 4.65) before the intervention to (51.6 ± 5.73) after the intervention. Moreover, the total PTGI score of the observation group after the intervention was significantly higher than that of the control group. Such difference was statistically significant, thereby suggesting that positive mental intervention based on Rosenthal effect is important in improving the post-traumatic growth level of patients after receiving chemotherapy for leukemia. This finding agrees with the findings of Douki et al. (17). With regard to mental intervention based on the Rosenthal effect, on the one hand, the medical staff presented the patients with some knowledge of their disease and cited successful treatment cases to bring hope and strengthen their vision and expectations for their treatment, all of which were conducive to building their hopes and thereby improve their post-traumatic growth level. On the other hand, the medical staff helped the patients set their expectations in overcoming the disease and eliminate their sense of fear and helplessness through listening, relaxation training, self-motivation, and other activities, all of which were conducive to improving their post-traumatic growth level. The transmission and internalization of expectations can help patients shift from a negative state to a positive one and facilitate their development of post-traumatic positive qualities. Therefore, enhancing positive mental intervention based on conventional nursing can improve the post-traumatic growth level of patients.

Results in Table 3 show that the SAS and SDS scores of the observation group have decreased from (56.24 ± 8.76) and (58.37 ± 8.64) before the intervention to (45.12 ± 6.12) and (47.31 ± 6.52) after the intervention. Moreover, the SAS and SDS scores of the observation group were significantly lower than those of the control group, thereby suggesting that mental intervention based on the Rosenthal effect can effectively relieve the

negative emotions of patients after receiving chemotherapy for leukemia. This result agrees with the conclusions of Sun et al. (18) probably due to the fact that the mental intervention based on the Rosenthal effect focuses on strengthening patients' understanding of their disease and improving their psychological feelings. This intervention also helps establish a trust-based relationship between medical staff and patients, increases the hopes of patients for a cure, builds their confidence in fighting the disease, eliminates their fear and worries about the disease, and relieves their psychological burden. During the mental intervention, these patients were continuously praised and motivated for them to perceive the effects of their subjective efforts, transform their passive behaviors into positive ones, and improve their self-approval, self-adjustment, and self-control abilities, thereby alleviating their annoyance from their external and internal environments (19). Moreover, the emotional changes of patients were tracked continuously to help them adjust their psychological health state in time. This mental intervention can generate dynamic and continuous effects on improving the negative emotions of these patients.

Results in Table 4 show that the facing score of the observation group after the intervention was higher than that of the control group, but the opposite was observed for the retreating and succumbing scores, thereby suggesting that the mental intervention based on the Rosenthal effect can improve the coping style of patients after receiving chemotherapy for leukemia. This result echoes those of previous studies (20). Coping is a cognitive and behavioral measure that individuals use to adapt to their internal demands and external environmental stimuli (21). A positive coping style can effectively improve the psychological and physical health of individuals (22). Coping style has become an important component of the intervention of patients with malignant tumors. Mental intervention based on the Rosenthal effect can help those patients who received chemotherapy for leukemia to adopt a positive coping style for two reasons. First, a mental intervention

based on the Rosenthal effect also strengthens the self-approval and self-adjustment of patients by enhancing their confidence and expectations in defeating their disease, releasing negative emotions, improving their psychological defense, and encouraging them to accept and face their disease peacefully. Second, in the mental intervention based on the Rosenthal effect, the team members helped the patients improve their self-motivation, control their negative emotions, reflect on how they can change their negative coping style, and strengthen their confidence and courage to face difficulties.

In sum, positive mental intervention not only relieves the negative emotions of patients after receiving chemotherapy for leukemia but also improves their coping system. Therefore, this intervention is critical to promoting the physical and psychological health of patients.

Conclusion

The mental intervention based on the Rosenthal effect improves the post-traumatic growth level of patients after receiving chemotherapy for leukemia, relieves their anxiety and depression, enhances their coping style, and facilitates their physiological and psychological recovery. Developing positive mental intervention methods based on relevant theories is worthy of clinical applications, especially among patients with cancer.

Journalism Ethics considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of interest

The authors declare that there is no conflict of interests.

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