Am J Transl Res 2021;13(7):7935-7943
www.ajtr.org /ISSN:1943-8141/AJTR0131920

Original Article

Effect of continuous nursing on negative emotion and quality of life in patients with leukemia under chemotherapy

Zhuanyi Sun, Yunhua Wang, Xiaowei Feng

Department of Hematology, The Second Affiliated Hospital, Zhejiang University School of Medicine, Hangzhou, Zhejiang Province, China

Received February 16, 2021; Accepted March 26, 2021; Epub July 15, 2021; Published July 30, 2021

Abstract: Objective: To investigate the effect of continuous nursing on negative emotion and quality of life in patients with leukemia under chemotherapy. Methods: Ninety-two patients with leukemia who received chemotherapy in our department were divided into observation group (n=46) and control group (n=46) according to the random number table. The patients in the control group were treated with routine nursing. The patients in the observation group were treated with continuous nursing on the basis of routine nursing. The scores of Hamilton Depression Rating Scale (HAMD), Hamilton Anxiety Rating Scale (HAMA) and Quality of Life Index Scale (Spitzer) of patients on admission and one month after discharge in both groups were compared. Results: There was no significant difference in HAMD, HAMA and Spitzer scores of patients on admission between the two groups (P>0.05). After one month of discharge, the HAMD and HAMA scores of patients in both groups were decreased, while the Spitzer scores of patients in both groups were increased (all P<0.05). In addition, compared with the control group, the HAMD and HAMA scores in the observation group were lower, while the Spitzer scores and nursing satisfaction in the observation group were higher (all P<0.001). The incidence of chemotherapy-related adverse reactions in the observation group was lower than that in the control group (P<0.01). Conclusion: Continuous nursing can improve the negative emotion, quality of life and nursing satisfaction in patients with leukemia under chemotherapy.

Keywords: Continuous nursing, chemotherapy, anxiety, depression, quality of life, leukemia

Introduction

Leukemia is a common hematological malignancy with an increasing occurrence year by year, which seriously threatens human health [1, 2]. Malignant proliferation, abnormal differentiation and apoptosis of hematopoietic stem cells in leukemia patients can inhibit the normal hematopoietic function [3]. Chemotherapy is an effective treatment for leukemia [4, 5]. However, adverse reactions induced by chemotherapy also cause more pain in leukemia patients [6, 7]. Although chemotherapy can prolong the survival of leukemia patients, it also can have a strong adverse effect on the physical and mental health of these patients, which will directly affect the effect of treatment [8].

How to avoid the negative emotions and improve the treatment compliance of leukemia patients during chemotherapy is an important challenge for the clinicians. Traditional care focuses on the treatment and nursing of patients during hospitalization. Although this nursing model meets the most health needs of patients during hospitalization, it is difficult to ensure continuous follow-up on disease information, nurse-patient management and nurse-patient relationship after discharge. Therefore, it is difficult to maintain a good nursing effect [9]. In recent years, the concept of continuing nursing has been proposed, and continuous nursing model has been identified as an essential element of high-quality health services. Study has shown that continuous nursing can improve the mental state of leukemia patients after discharge and reduce the incidence rate of adverse reactions [10]. However, there is still a lack of large-scale and in-depth research on the effect of continuous nursing in patients with leukemia under chemotherapy. This study aimed to further investigate the effect of con-

tinuous nursing on negative emotions and quality of life in patients with leukemia under chemotherapy.

Materials and methods

General information

This study is a prospective study. A total of 92 leukemia patients admitted to our department from February 2018 to February 2019 were randomly divided into observation group (n=46) and control group (n=46). The patients in the control group were treated with routine nursing, and the patients in the observation group were treated with continuous nursing on the basis of routine nursing. The study was approved by the Ethics Committee of our hospital.

Inclusion criteria: Clinical diagnosis met the diagnostic criteria for leukemia [11, 12]. Expected survival time >2 years; patients who signed the informed consent.

Exclusion criteria: Combined with severe organ dysfunction; combined with other malignancies; combined with mental disorder and cognitive dysfunction; patients with history of analgesic, sedative or alcohol dependence; patients with suicidal tendency.

Methods

Patients in the control group were given routine care and follow-up [13]. Health education and full communication: Patients were told about knowledge of leukemia and its treatment, daily precautions for chemotherapy and common adverse reactions during chemotherapy, which could strengthen their psychological construction. Trust relationship between patients and their families was established through good professional knowledge and communication of doctors. Psychological guidance nursing: Communication with patients was strengthened to relieve their negative emotions such as anxiety, fear and irritability. Exercise guidance: Patients were encouraged to carry out appropriate physical exercise and avoid extreme behaviors such as strenuous exercise or complete motionless. Standardized medication guidance: Patients were told about the effect and precautions of related drugs. The importance of taking medication regularly as advised and adverse consequences caused by self-stopping medication was emphasized. Post-discharge follow-up: patients were told about precautions after discharge as well as time and content of subsequent visit.

Based on the existing study, the patients in the observation group were treated with continuous nursing on the basis of the control group [10]. Firstly, setting up a continuous nursing intervention group: The group included a hematologist responsible for development of treatment programmes, evaluation of interventions and guidance on the revision of related measures, one head nurse of hematology department responsible for development, guidance, revision and evaluation of nursing programmes, two master's degree students of nursing responsible for data collection and analysis as well as two specialist nurses in hematology and two primary nurses responsible for program implementation of continuous nursing and related information collection feedback. Secondly, establishing a communication platform for continuous nursing: relevant communication platforms for patients and their families were established using existing online social tools such as WeChat and QQ. The significance, contents and operation methods of relevant communication platforms were fully explained to patients and their families. The personal files of patients were then established. Thirdly, popularization of related knowledge about leukemia and chemotherapy, possible complications and countermeasures was conducted at fixed time through the communication platform. On the communication platform, patients were supervised to take medicine according to the instructions and give feedback in time. Fourthly, for discharged patients, regular discussion (every Wednesday evening at 19:00) was initiated through group voice and video mode to remind patients to return to hospital, encourage patients to communicate with their friends and arrange for patients with better recovery to introduce their own disease resistance experience, which can guide patients to jointly establish confidence in overcoming diseases. Fifthly, the questions from the patients and their families in the group were collected and answered regularly (every Saturday evening at 19:00). Professional guidance for patients was performed. Those common and difficult problems were collected and fed back to doctors or head nurse who would solve the problems at the next question answering after proposing solutions. Sixthly, the follow-up was strengthened

using online communication platform. The patients who failed to participate in group activities or return to hospital timely were followed up to strengthen their compliance of return visit.

Outcome measures

Primary outcome measures: The psychological state and quality of life of patients before and after nursing in both groups were observed and compared.

Secondary outcome measures: The difference in incidence rate of chemotherapy-related adverse reactions and nursing satisfaction of patients after one month of discharge in both groups were observed. Total incidence rate of adverse reactions = number of all kinds of adverse reactions/total number of cases *100%.

Evaluation criteria

Evaluation criteria for mental status: The depression of patients was evaluated with Hamilton Depression Rating Scale (HAMD) including 17 items [14]. The score >17 was suggestive of depression. The score of 8-17 was suggestive of possible depression. The score <7 was suggestive of no depression. The anxiety of patients was evaluated with Hamilton Anxiety Rating Scale (HAMA) including 14 items [15]. The score >14 was suggestive of anxiety. The score of 7-14 was suggestive of possible anxiety. The score <7 was suggestive of no anxiety. A higher score indicates greater anxiety or depression severity.

Evaluation criteria for quality of life: The quality of life of patients was evaluated with Quality of Life Index Scale (Spitzer) including mental outlook, health condition, support, psychological condition and activity [16, 17]. The score for each item was 2 points with a total score of 10 points. The higher score indicates the better quality of life.

Evaluation of nursing satisfaction: The nursing satisfaction of patients was assessed by self-made questionnaire of our department. The score of 80-100 was considered to be very satisfied. The score of 60-79 was considered to be satisfied. The score <60 was considered to be unsatisfied. Nursing satisfaction = (very satisfied + satisfied)/total cases *100%.

Statistical analysis

SPSS 26.0 software was used for data processing and statistics. The enumeration data were expressed as number and percentage (n, %) and analyzed by Chi-square test. The measurement data were expressed as mean ± standard deviation ($\bar{x}$ ± sd). Intergroup comparisons were conducted by independent-sample t-tests, while intragroup comparisons were analyzed by paired-sample t-tests. P<0.05 was considered statistically significant.

Results

Comparison of general information

There were no differences in age, sex, body mass index (BMI), smoking, drinking, comorbidity, family history of leukemia, leukemia typing, chemotherapy regimen and combination with other treatments (all P>0.05). See **Table 1**.

Comparison of psychological state of patients before and after nursing between the two groups

There was no significant difference in depression and anxiety scores of patients on admission between the two groups (all P>0.05). After one month of discharge, the scores of depression and anxiety in both groups were all decreased (P<0.05), and the scores in the observation group were lower than those in the control group (P<0.001). See **Table 2** and **Figures 1**, **2**.

Comparison of quality of life score of patients before and after nursing between the two groups

There was no significant difference in quality of life scores of patients on admission between the two groups (all P>0.05). After one month of discharge, the quality of life scores of patients in both groups were increased (P<0.05), and the scores in the observation group were higher than those in the control group (P<0.001). See **Table 3** and **Figure 3**.

Comparison of incidence rate of chemotherapy-related adverse reactions of patients after nursing between the two groups

After one month of discharge, the incidence rate of chemotherapy-related adverse reac-

Table 1. Comparison of general information between the two groups

Items	Observation group	Control group	χ^2/t	P
Cases (n)	46	46		
Age (years)	53.7±6.9	55.4±7.2	1.156	0.251
Sex (male/female, n)	22/24	20/26	0.175	0.675
BMI (kg/m^2)	24.74±2.98	24.12±3.01	1.043	0.298
Smoking (n)	12	15	0.472	0.492
Drinking (n)	15	13	0.205	0.650
Comorbidity				
Hypertension (n)	11	15	0.858	0.354
Diabetes mellitus (n)	9	12	0.555	0.456
Hyperlipemia (n)	15	10	1.373	0.241
Family history of leukemia (n)	15	11	0.858	0.354
Leukemia typing (n)			0.763	0.943
Acute lymphoblastic leukemia	9	11		
Acute myeloid leukemia	13	13		
Chronic myeloid leukemia	10	11		
Chronic lymphoblastic leukemia	12	10		
Other types of leukemia	2	1		
Chemotherapy regimen (n)			1.074	0.983
DA	7	9		
DAT	8	8		
HA	6	7		
ATRA	5	4		
VDLP	9	7		
CHOP	10	9		
Other regimens (n)	1	2		
Combination with other treatments (n)			0.539	0.764
Targeted therapy	11	13		
Surgical treatment	4	6		
Others	3	2		

Notes: DA: Daunorubicin + Aracytidine; DAT: Daunorubicin + Aracytidine + Thioguanine + Etoposide; HA: Homoharringtonine + Aracytidine + Thioguanine; ATRA: All-trans retinoic acid; VDLP: Vincristine + Daunorubicin + Lasparaginase + Prednisone; CHOP: Cyclophosphamide + Doxorubicin + Vincristine + Prednisone.

Table 2. Comparison of psychological status scores of patients before and after nursing between the two groups (points)

Group	HAMD score	HAMA score
Observation group (n=46)		
On admission	18.52±3.76	17.44±3.02
One month after discharge	11.23±4.02$^{***,\#\#\#}$	10.84±3.12$^{***,\#\#\#}$
Control group (n=46)		
On admission	18.33±3.82	17.92±2.82
One month after discharge	16.54±3.95*	16.48±2.98*

Notes: Compared with on admission, *P<0.05, ***P<0.001; compared with the control group, $^{\#\#\#}$P<0.001. HAMD: Hamilton Depression Rating Scale; HAMA: Hamilton Anxiety Rating Scale.

tions of patients in the observation group was lower than that in the control group (P<0.01). See **Table 4**.

Comparison of nursing satisfaction of patients between the two groups

After one month of discharge, the nursing satisfaction of patients in the observation group was higher than that in the control group (P<0.001). See **Table 5**.

Discussion

Chemotherapy is a commonly used treatment for leukemia. However, a series of adverse reactions during chemotherapy can also bring great pain and negative emotions to patients, which may have a

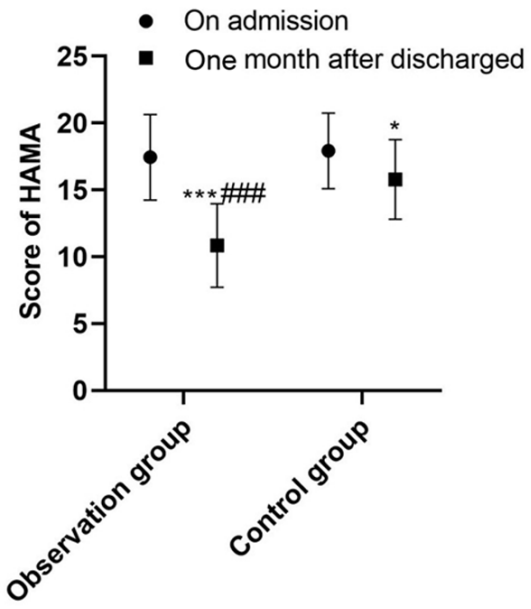

Figure 1. Comparison of HAMA score before and after nursing between the two groups. Compared with on admission, *P<0.05, ***P<0.001; compared with the control group, ###P<0.001. HAMA: Hamilton Anxiety Rating Scale.

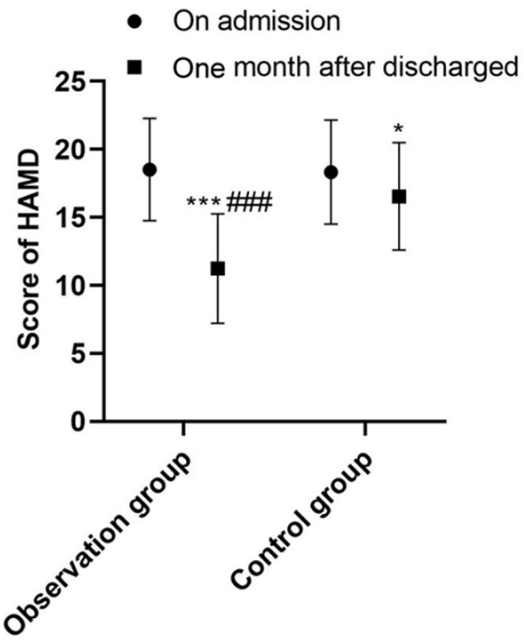

Figure 2. Comparison of HAMD scores before and after nursing between the two groups. Compared with on admission, *P<0.05, ***P<0.001; compared with the control group, ###P<0.001. HAMD: Hamilton Depression Rating Scale.

direct impact on the therapeutic effect by reducing patient compliance [8]. Continuing nursing has been shown to improve patients' negative emotions, treatment compliance and quality of life [18].

In this study, after nursing, the decrease of depression and anxiety scores in the observation group was more obvious than that in the control group, suggesting that continuous nursing can improve the psychological state in patients with leukemia under chemotherapy, which is better than traditional care. Study has shown that continuous nursing can improve the psychological state and quality of life of patients, which is consistent with the results of this study [19]. The reason may be that through continuous nursing, the communication between medical staff and leukemia patients under chemotherapy as well as their families was strengthened, which can help medical staff better grasp the changes of the patient's conditions. All these measures can effectively avoid the negative emotions of patients. At the same time, through the establishment of communication between patients, continuous nursing model took patients with better therapeutic effect as an example to publicize and introduce their successful treatment experience and achievements, so as to establish the confidence to overcome the disease for other patients, avoid the breeding of various adverse emotions of patients, and effectively improve the psychological state of patients. Previous study has shown that continuous nursing can increase patients' ability to master disease-related knowledge and alleviate their negative emotions, which is also in accordance with the results in this study [20].

With the constant progress and development of nursing model, the ultimate goal of nursing is no longer limited to simply prolonging the survival time of patients, but paying more attention to improving the quality of life of patients. Studies have shown that continuous nursing can improve the quality of life of patients with a variety of diseases [21-23]. In this study, after nursing, the quality of life scores of patients in the observation group were higher than those in the control group, suggesting that continuous nursing can better improve the quality of life of patients with leukemia under chemotherapy, which is consistent with previous research [10]. The reason may be that continuous nursing not only strengthened the basic nursing measures in the hospital, but also increased

Table 3. Comparison of quality of life scores of patients before and after nursing between the two groups (points)

Group	Mental outlook	Health condition	Support	Psychological condition	Activity	Aggregate score
Observation group						
On admission	0.55±0.11	0.75±0.35	0.42±0.05	0.24±0.18	0.56±0.18	2.62±0.42
One month after discharge	1.28±0.13$^{***,\#\#\#}$	1.77±0.42$^{***,\#\#\#}$	1.21±0.07$^{***,\#\#\#}$	1.13±0.28$^{***,\#\#\#}$	1.32±0.24$^{***,\#\#\#}$	6.96±0.58$^{***,\#\#\#}$
Control group						
On admission	0.53±0.09	0.72±0.38	0.42±0.08	0.22±0.16	0.54±0.22	2.65±0.38
One month after discharge	0.64±0.28*	0.92±0.45*	0.47±0.12*	0.32±0.22*	0.64±0.18*	2.82±0.35*

Note: Compared with on admission, *P<0.05, ***P<0.001; compared with the control group, $^{\#\#\#}$P<0.001.

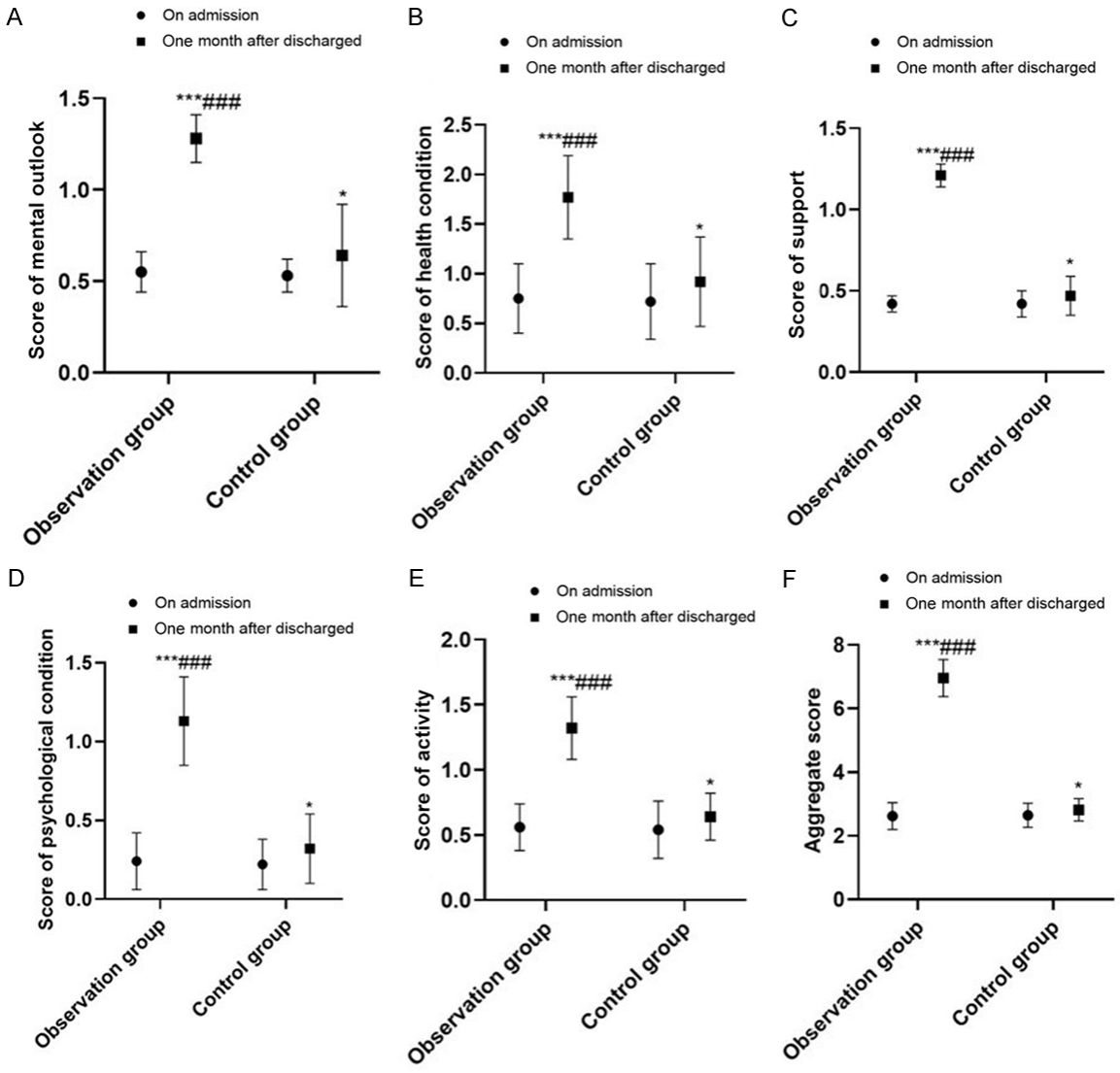

Figure 3. Comparison of quality of life scores before and after nursing between the two groups. A: Mental outlook score; B: Health condition score; C: Support score; D: Psychological condition score; E: Activity score; F: Aggregate score. Compared with on admission, *P<0.05, ***P<0.001; compared with the control group, $^{\#\#\#}$P<0.001.

the intensity and coverage time outside the hospital. Its nursing content is not only for patients, but also has a better educational communication effect for patients' families,

Table 4. Comparison of incidence rate of chemotherapy-related adverse reactions of patients after nursing between the two groups (n, %)

Group	Observation group	Control group
Number of cases	46	46
Oral infection	3 (6.52)	5 (10.87)
Perianal infection	2 (4.35)	4 (8.70)
Gastrointestinal reaction	5 (10.87)	9 (19.57)
Subcutaneous hemorrhage	1 (2.17)	3 (6.52)
Gastrointestinal bleeding	0 (0.00)	1 (2.17)
Hair loss	4 (8.70)	8 (17.39)
Total number of cases	15 (32.61)**	30 (65.22)

Note: Compared with the control group, **P<0.01.

Table 5. Comparison of nursing satisfaction of patients between the two groups (n, %)

Group	Observation group	Control group	P
Number of cases (n)	46	46	
Very satisfied	42 (91.30)	20 (43.49)	<0.001
Satisfied	2 (4.35)	12 (26.09)	<0.001
Dissatisfied	2 (4.35)	14 (30.43)	<0.001
Overall satisfaction	44 (95.65)	32 (69.57)	<0.001

which has been shown to improve patients' compliance and quality of life [24, 25].

Chemotherapy prolongs the survival of patients with various types of cancer, but it also increases the pain due to adverse reactions to chemotherapy. Study has shown that adverse reactions to chemotherapy can affect the quality of life of patients [26]. In this study, after nursing, the incidence rate of chemotherapy-related adverse reactions of patients in the observation group was lower than that in the control group, suggesting that continuous nursing can reduce the incidence rate of chemotherapy-related adverse reactions in leukemia patients. This can also be attributed to the fact that continuous nursing enhances in-and out-of-hospital nursing, enabling patients and their families to better understand and master knowledge about the disease itself and chemotherapy. Thus, patients can achieve 'early understanding', 'early knowing', 'early prevention' and 'early treatment' about various possible adverse reactions, and finally the incidence rate of adverse reactions is decreased.

Nursing satisfaction reflects the degree of patients' satisfaction with nursing work. Through the investigation of patients' nursing satisfaction, it is helpful to find out the missing and make up for the deficiency as well as improve their quality of nursing. In this study, the nursing satisfaction of patients in the observation group was higher than that in the control group, suggesting that continuous nursing can improve the nursing satisfaction of patients with leukemia under chemotherapy.

However, the present study has several limitations. First, the overall sample size was relatively small. Second, multicenter studies for simultaneous comparison as well as observation and research on specific and clear nursing measures were deficient. For example, study have shown that continuous nursing for patients with leukemia undergoing central venous catheterization can reduce the incidence rate of adverse events [27]. Finally, the follow-up period was short. It is worthwhile to expand the sample, extend the follow-up time and take a multicenter joint approach for further study.

In conclusion, continuous nursing can improve the negative emotion, quality of life and nursing satisfaction as well as reduce the incidence rate of chemotherapy-related adverse reactions in patients with leukemia under chemotherapy.

Disclosure of conflict of interest

None.

Address correspondence to: Zhuanyi Sun, Department of Hematology, The Second Affiliated Hospital, Zhejiang University School of Medicine, No. 1511 Jianghong Road, Binjiang District, Hangzhou 310052, Zhejiang Province, China. Tel: +86-139-89880713; E-mail: sunzhuanyi@zju.edu.cn

References

[1] Bosch F and Dalla-Favera R. Chronic lymphocytic leukaemia: from genetics to treatment. Nat Rev Clin Oncol 2019; 16: 684-701.

[2] Hansen BA, Wendelbo Ø, Bruserud Ø, Hemsing AL, Mosevoll KA and Reikvam H. febrile neutropenia in acute leukemia. Epidemiology, etiology, pathophysiology and treatment. Mediterr J Hematol Infect Dis 2020; 12: e2020009.

[3] El Hussein S, Patel KP, Fang H, Thakral B, Loghavi S, Kanagal-Shamanna R, Konoplev S,

Jabbour EJ, Medeiros LJ and Khoury JD. Genomic and immunophenotypic landscape of aggressive NK-cell leukemia. Am J Surg Pathol 2020; 44: 1235-1243.
[4] Butturini A and Gale RP. Chemotherapy versus transplantation in acute leukaemia. Br J Haematol 1989; 72: 1-8.
[5] Xu ZL and Huang XJ. Therapeutic approaches for acute promyelocytic leukaemia: moving towards an orally chemotherapy-free era. Front Oncol 2020; 10: 586004.
[6] Rajagopala SV, Singh H, Yu Y, Zabokrtsky KB, Torralba MG, Moncera KJ, Frank B, Pieper R, Sender L and Nelson KE. Persistent gut microbial dysbiosis in children with acute lymphoblastic leukemia (ALL) during chemotherapy. Microb Ecol 2020; 79: 1034-1043.
[7] Xu FL, Guan XM, Wen XH, Shen YL, Xiao JW, Guo YX, Deng MY and Yu J. Serious adverse events associated with chemotherapy in children with acute lymphoblastic leukemia. Zhongguo Dang Dai Er Ke Za Zhi 2020; 22: 828-833.
[8] Hu R, Wu Y, Jiang X, Zhang W and Xu L. Clinical symptoms and chemotherapy completion in elderly patients with newly diagnosed acute leukemia: a retrospective comparison study with a younger cohort. BMC Cancer 2011; 11: 224.
[9] Zhang XH and Feng M. Effects of continuing care on self-care ability and maternal and child health of primipara in puerperium. Clin Res Pr 2019; 25: 175-176.
[10] Ji HS, Li CY and Cheng C. Effect of WeChat based continuous nursing on psychological status and quality of life in patients with leukemia after discharge. Zhongguo Zhongliu Linchuang Yu Kangfu 2018; 25: 229-232.
[11] Smith G, Apperley J, Milojkovic D, Cross NCP, Foroni L, Byrne J, Goringe A, Rao A, Khorashad J, de Lavallade H, Mead AJ, Osborne W, Plummer C, Jones G and Copland M. A British society for haematology guideline on the diagnosis and management of chronic myeloid leukaemia. Br J Haematol 2020; 191: 171-193.
[12] Schuh AH, Parry-Jones N, Appleby N, Bloor A, Dearden CE, Fegan C, Follows G, Fox CP, Iyengar S, Kennedy B, McCarthy H, Parry HM, Patten P, Pettitt AR, Ringshausen I, Walewska R and Hillmen P. Guideline for the treatment of chronic lymphocytic leukaemia: a british society for haematology guideline. Br J Haematol 2018; 182: 344-359.
[13] Perry and Ann M. Chronic myeloid leukaemia: a guide for practice nurses. Pract Nurs 2017; 28: 419-423.
[14] Carrozzino D, Patierno C, Fava GA and Guidi J. The Hamilton rating scales for depression: a critical review of clinimetric properties of different versions. Psychother Psychosom 2020; 89: 133-150.
[15] Zimmerman M, Martin J, Clark H, McGonigal P, Harris L and Holst CG. Measuring anxiety in depressed patients: a comparison of the Hamilton anxiety rating scale and the DSM-5 anxious distress specifier interview. J Psychiatr Res 2017; 93: 59-63.
[16] Xiao C, Zhang Q, Nguyen-Tân PF, List M, Weber RS, Ang KK, Rosenthal D, Filion EJ, Kim H, Silverman C, Raben A, Galloway T, Fortin A, Gore E, Winquist E, Jones CU, Robinson W, Raben D, Le QT and Bruner D. Quality of life and performance status from a substudy conducted within a prospective phase 3 randomized trial of concurrent standard radiation versus accelerated radiation plus cisplatin for locally advanced head and neck carcinoma: NRG oncology RTOG 0129. Int J Radiat Oncol Biol Phys 2017; 97: 667-677.
[17] Li L and Yeo W. Value of quality of life analysis in liver cancer: a clinician's perspective. World J Hepatol 2017; 9: 867-883.
[18] Guo X, Men F, Han X and Wang Z. The efficacy of continuous nursing care for patients with chronic obstructive pulmonary disease: a randomized controlled trial protocol. Medicine (Baltimore) 2021; 100: e23974.
[19] Rahimi A, Ahmadi F and Gholyaf M. The effects of continuous care model on depression, anxiety, and stress in patients on hemodialysis. Nephrol Nurs J 2008; 35: 39-43.
[20] Yuan AY, Cheng L and Zou BN. Effect of continuous nursing on knowledge mastery, self-care ability and anxiety of elderly patients with chronic diseases. Nurs Pract Res 2018; 15: 42-44.
[21] Moghaddam Tabrizi F, Rajabzadeh H and Eghtedar S. Effects of the continuous care model on the health-promoting lifestyle in breast cancer survivors: a randomized clinical trial. Holist Nurs Pract 2020; 34: 221-233.
[22] Khodaveisi M, Ashtarani F, Beikmoradi A, Mohammadi N, Mahjub H, Mazdeh M and Ashtarani E. The Effect of continuous care on the lifestyle of patients with multiple sclerosis: a randomized clinical trial. Iran J Nurs Midwifery Res 2017; 22: 225-231.
[23] Wen P, Bai YQ, Luo M, Hu YL and Lei XQ. Effects of continual nursing on quality of life and parental care ability for acute leukemia children with PICC in remission induction stage after discharge. Mod Clin Nurs 2018; 17: 38-43.
[24] Stevens L, Fry M, Browne M and Barnes A. Fast track patients' satisfaction, compliance and confidence with emergency department discharge planning. Australas Emerg Care 2019; 22: 87-91.
[25] Harmaniati, Kusumaningrum T and Amin NKA. Study of family support correlation in affecting breast cancer patient's compliance in the chemotherapy program in Indonesia National Hos-

pital. J Comput Theor Nanosci 2020; 7: 3041-3046.

[26] Prieto-Callejero B, Rivera F, Fagundo-Rivera J, Romero A, Romero-Martín M, Gómez-Salgado J and Ruiz-Frutos C. Relationship between chemotherapy-induced adverse reactions and health-related quality of life in patients with breast cancer. Medicine (Baltimore) 2020; 99: e21695.

[27] Yuan QX, Xie XY, Tan YY, Yu L and Zhu S. Clinical value of continuous nursing mode for leukemia discharged patient with PICC. J Mol Imaging 2019; 42: 141-144.