

ORIGINAL RESEARCH

Nursing Experience in Allogeneic Hematopoietic Stem Cell Transplantation for Acute Lymphoblastic Leukemia

Xia Wu, MM; Jiao Chao, MM; Qiufang Xu, MM

ABSTRACT

Background • Allogeneic hematopoietic stem cell transplantation stands as a vital treatment for leukemia, yet its implementation poses considerable challenges and complications. A comprehensive understanding of these challenges is crucial for appreciating the significance of enhanced nursing care.

Objective • To explore and summarise the nursing experience of allogeneic haematopoietic stem cell transplantation for acute lymphoblastic leukaemia. The significance of this objective lies in the potential transformative impact that enhanced nursing care can have on overall patient outcomes within the context of allogeneic hematopoietic stem cell transplantation.

Methods • Patients with acute lymphoblastic leukaemia treated with allogeneic haematopoietic stem cell transplantation in our hospital between August 2020 and January 2022 were recruited for this study. A total of 50 patients who met the complete inclusion criteria were enrolled and included in this study. Patients in the traditional group were given traditional nursing interventions, while patients in the exploration group were offered individualized interventions according to their personalized plans. In the traditional group, standard nursing care involved routine health education, vital signs monitoring, and sterile care in a laminar flow ward. Post-transplantation changes were observed, and patients were encouraged to engage in suitable exercises. The exploration

group received enhanced infection control measures, including regular disinfection and cleaning of patient wards. Individualized care plans, collaborative chemotherapy consultations, and extensive patient and family education were implemented. Clinical data of all patients were collected, and their nursing experience was summarized and analyzed by comparing the incidence of adverse reactions and evaluating nursing satisfaction.

Results • The analysis group demonstrated a significantly lower incidence of adverse reactions compared to the traditional group. Specifically, the total adverse reaction rate in the analysis group was 8.00%, markedly lower than the traditional group's 48.00% ($P < .05$). Moreover, patient satisfaction in the exploration group was significantly higher than that observed in the traditional group ($P < .05$). In detail, the satisfaction level in the exploration group reached 92.67%, while the traditional group reported a satisfaction level of 77.56%.

Conclusion • For patients with acute lymphoblastic leukaemia who received allogeneic haematopoietic stem cell transplantation, a personalized care intervention plan involving careful primary nursing, full protection and enhanced psychological care can effectively improve the adverse effects of sleep, thus increasing their satisfaction with nursing. (*Altern Ther Health Med.* [E-pub ahead of print.])

Xia Wu, MM; Jiao Chao, MM; Qiufang Xu, MM; Department of Hematology, The First Affiliated Hospital of Soochow University, Suzhou, China.

Corresponding author: Qiufang Xu, MM
E-mail: quebu759@163.com

INTRODUCTION

Acute lymphoblastic leukemia (ALL) is a clinically common malignant haematological disease¹ in which abnormal proliferation of progenitor cells impairs the bone

marrow, suppresses normal haematopoiesis and invades extramedullary tissues such as the meninges, lymph nodes, gonads and liver.^{2,3} The same clinical symptoms characterize ALL as other acute leukaemias, mainly manifested as hemorrhage, anemia, fever, leukocyte infiltration.⁴ Hyperleukocytic acute leukaemia causes stagnation of white blood cells in the blood vessels, which affects some microcirculation and results in symptoms such as dizziness, shortness of breath, dizziness, headache, vertigo, fatigue, chest tightness, asthma, bloating, nausea, loss of appetite and other causes of organ ischaemia and hypoxia due to anaemia,

and bleeding due to thrombocytopenia. Patients with mild symptoms may experience bruising of the skin and mucous membranes, bleeding gums and nosebleeds, and in severe cases, there may even be blood in the stool and urine as well as cerebral haemorrhage, frequently life-threatening.^{5,6}

The incidence of leukaemia has been investigated in China, with an overall incidence of approximately 0.67/100 000. Allogeneic haematopoietic stem cell transplantation (allo-HSCT) is currently the sole treatment option for the eradication of leukaemia. The paramount advantage of allo-HSCT lies in its potential for achieving long-term disease-free survival, a characteristic particularly pronounced in pediatric cases where approximately 80% of patients experience successful outcomes, and in adults, with a noteworthy 30% achieving sustained remission.^{7,8} It is transplantation of haematopoietic stem cells with bone marrow, peripheral blood stem cells, umbilical cord blood stem cells and other paired donor cell sources using matched donor cell resources that can radically treat diseases such as abnormal globulinemia, aplastic anaemia and leukaemia.^{9,10} Unfortunately, the high doses of chemotherapy and immunosuppressants applied during transplantation can leave the patients with defective stem cells, resulting in reduced resistance, infection, bleeding, graft-versus-host disease, graft failure and even death. In addition, bone marrow function can only be restored following a period of transplantation and patients are required to be isolated in a laminar flow ward, thus predisposing them to negative emotions.¹¹ Hence, appropriate care modalities are required to intervene to reduce the incidence of adverse reactions, ameliorate patients' negative emotions and facilitate their recovery through targeted disinfection of the environment, infection pre-treatment and psychological interventions.

In a word, ALL is a malignant hematological disease characterized by abnormal proliferation of progenitor cells, which affects normal hematopoiesis and invades extramedullary tissues. The treatment of choice for ALL is allo-HSCT. However, allo-HSCT can lead to complications and reduced resistance, posing challenges for patient care. Given the potential complications and impact on patient outcomes, it is crucial to explore and summarize nursing experiences related to allo-HSCT for acute lymphoblastic leukemia. Understanding effective nursing interventions can help improve patient care, reduce adverse reactions, and enhance patient satisfaction. To this end, the study aims to investigate and summarize the nursing experience of allo-HSCT for acute lymphoblastic leukemia. Specifically, it seeks to compare the incidence of adverse reactions and nursing satisfaction between patients receiving traditional nursing interventions and those receiving individualized interventions based on personalized plans.

MATERIALS AND METHODS

Study design

The study utilizes a retrospective design. Patients with acute lymphoblastic leukemia who underwent allogeneic

hematopoietic stem cell transplantation (allo-HSCT) between August 2020 and January 2022 at the hospital were recruited for the study.

Participants

Fifty patients treated with allogeneic hematopoietic stem cell transplantation at our hospital between August 2020 and January 2022 were recruited and retrospectively analyzed, with no gender restriction. Patients in the conventional group were given conventional nursing interventions, while patients in the exploratory group received individualized interventions according to their personalized schemes.

Inclusion and exclusion criteria

Inclusion criteria. 1) patients who were diagnosed with acute lymphoblastic leukaemia¹² and treated with allogeneic haematopoietic stem cell transplantation in our hospital; 2) patients who received their first transplant without restriction to gender; 3) patients with complete clinical data; 4) patients who were able to understand the study and were able to cooperate with the treatment. **Rationale:** Inclusion of patients with a confirmed clinical diagnosis ensures the homogeneity of our study cohort, focusing specifically on individuals with acute stroke. The inclusion of cases within a 12-hour onset window is essential to capture the acute phase of stroke, allowing us to investigate the immediate impact of optimized emergency care pathways. A GCS score between 3 and 13 ensures the inclusion of patients across varying levels of consciousness, providing a comprehensive understanding of the optimized emergency care pathway's effectiveness across different clinical presentations. Confirming cerebrovascular diagnosis through advanced imaging techniques such as CT or MRI enhances the precision of our study, eliminating potential misclassifications and ensuring a more accurate representation of stroke cases.

Exclusion criteria. 1) Patients who participated in other similar studies; 2) patients with dysfunction of vital organs such as liver, kidney and heart; 3) patients with psychiatric disorders etc., or family history of genetic, and psychiatric disorders; 4) patients with autoimmune system disorders etc. (This is because autoimmune diseases involve dysregulation of the immune system, and the use of immunosuppressive treatments in patients with these conditions may interact with the objectives and outcomes of the study, potentially confounding the results. Additionally, patients with autoimmune diseases may have unique medical considerations and treatment requirements that could affect their participation and response to the intervention being studied.) **Rationale:** Exclusion of transferred patients mitigates confounding factors introduced by prior medical interventions, ensuring that the observed outcomes are predominantly influenced by the optimized emergency care pathway. Excluding individuals who have undergone thrombolysis or embolization helps isolate the impact of optimized emergency care pathways, minimizing potential interactions with the effects of these interventions. Exclusion

of patients with severe organ dysfunction ensures a more homogeneous study population, reducing variability in outcomes associated with pre-existing organ complications. Excluding individuals with coagulation dysfunction aligns with the study's focus on emergency care pathways' impact on stroke outcomes, preventing confounding factors related to coagulation status. Autoimmune diseases are excluded due to potential interactions that could influence the study objectives. This decision aims to maintain a study cohort where the optimized emergency care pathway's impact remains the primary focus without undue influence from autoimmune-related complications.

Intervention methods

Traditional group. Patients in the conventional group were given conventional nursing interventions as follows: upon admission, all patients and their families were given routine health education on the procedures and precautions associated with allogeneic HSCT, and their families were instructed to relieve the patients of the stress of treatment; routine nursing care was administered, including vital signs testing, and patients were instructed to balance their nutritional intake, etc. Sterile care was provided after isolation in the laminar flow ward, and treatment was coordinated according to the doctor's recommendations during care. Regular observation and documentation of changes were done for the patient's condition after transplantation, and any abnormalities were promptly reported to the doctor. Patients were encouraged to perform simple exercises, etc. as appropriate.

Exploration group. On the basis of the traditional group, patients in the exploration group were given individualised interventions according to the patients' own conditions, as follows:

- 1) Healthcare staff washed and disinfected their hands before and after contact with patients, and wore disposable sterile gloves or rubber gloves when touching patients; effective disinfection and cleaning of patients' wards were carried out regularly; daily linen such as bed sheets and covers were changed regularly and autoclaved, air circulation in the wards was maintained, and the air was checked regularly for excess bacteria levels.
- 2) Individualised care plans were developed for the patients themselves, and their psychological and nutritional status was assessed. The selection of chemotherapy drugs and prevention of adverse reactions were consulted with the pharmacist; patients and their families were informed of the principles of allogeneic HSCT, the importance of chemotherapy and the precautions to be taken when entering the isolation ward, and patients who had recovered from transplantation were invited to share their experiences by telephone or video to boost their confidence in the success of transplantation. The components of individualized care plans and psychological interventions include:

- a) Emotional support: Providing a supportive and empathetic environment for patients to express their emotions and concerns.
 - b) Psychoeducation: Educating patients about their condition, treatment process, and potential side effects to enhance their understanding and coping abilities.
 - c) Cognitive-behavioral therapy (CBT): Incorporating CBT techniques to help patients identify and modify negative thought patterns and develop healthier coping strategies.
 - d) Relaxation techniques: Teaching patients relaxation exercises such as deep breathing, progressive muscle relaxation, or guided imagery to reduce stress and anxiety.
 - e) Psychological counseling: Offering one-on-one counseling sessions with a trained psychologist or therapist to address specific psychological challenges and provide guidance.
- 3) Prior to treatment, the treatment was explained to the patient and his family so that the patient could familiarise himself with the service environment, grasp the relevant precautions to be taken prior to treatment and understand the treatment methods to be used. Based on the results of the psychologist's assessment, patients were given targeted psychological counselling, and were guided through meditation and relaxation and thoughtful guidance. The patient's family was guided to give sufficient compassion, care and support to enable the patient to maintain a friendly and harmonious atmosphere, to work with the patient's family to relax and guide the patient to maintain a good mood, and to communicate individually with patients with mood disorders. Patients who refuse treatment, wait for death or even commit suicide should be promptly counselled to help them find a solution or be guided to develop hobbies to divert their attention.
 - 4) Patients were advised to avoid spicy and irritating foods, mainly light and digestible food, and to take appropriate supplements of high protein and high-calorie foods to strengthen the body's resistance and ensure vegetables and fruits were available to supplement vitamins to stimulate the body's metabolism and help improve immunity; meal plans are drawn up according to the patient's nutritional indicators and family members are advised on how to prepare three meals for the patient; food was checked for nutritional soundness upon arrival at the laminar flow ward and was sterilised in a microwave oven.
 - 5) A rehabilitation care plan is developed to guide patients in performing appropriate exercises to improve their immunity and self-control, which will help to achieve therapeutic effects. Regularly check the oral hygiene of the patients and do a good job of oral care. You can strengthen mouthwash and use mucosal protectants. Specific preventive measures include brushing teeth with chlorhexidine acetate mouthwash (containing chlorhexidine acetate+menthol+glycerin)+sponge stick

before getting up in the morning and going to bed and rinsing with room temperature boiled water (purified water) before eating. After eating, rinse with room temperature boiled water/0.9% salt water in turn, using mouthwash 15-30ml each time for 30 seconds; 2 days of unresolved stools, oral lactulose (Dumic), 3 days without opening Selu enema to detoxify.

- 6) Carry out perianal care, keep perianal dry and clean, pay attention to the correct wiping technique and paper use (pay attention to the menstrual period of female patients), carry out anti-inflammatory sitz bath and casual sitz bath BID, carry out anal lifting exercise TID, keep the stool smooth and regular, and ensure the patient's diet quality and disinfection time; For patients with constipation, crude fiber diet should be given, laxative should be given as appropriate. At the same time, excessive defecation should be prohibited, and attention should be paid to defecation, and the drug should be stopped in time; For diarrhea patients, it is necessary to avoid crude fiber diet, antidiarrheal and smecta, and use dry cleaning agent+skin cleaning towel for cleaning, and use 0.02% chlorhexidine wet towel for disinfection; As for the patients with perianal infection, they need to be divided into 4 degrees according to the degree of reaction, namely 0 degree: the skin around the anus is clean and dry, the mucosa is complete, and there is no conscious symptom; 1 degree: the skin around the anus is hard and the mucosa is red and fat, and there is no bleeding when defecating; 2 degree: the skin around the anus is red, hot and painful, or the diameter of the skin crack is less than 0.5 cm; 3 degree: the skin around the anus is red, hot and painful, or the diameter of the skin crack is more than 0.5 cm, with abscess; According to the specific level of the patient, specific care will be given. Among them, the 0 degrees is treated as diarrhea, and the 1 degree is wiped with 1:1 painless iodine cotton ball for 3 times on the basis of 0 degrees. On the basis of degree 2, Beifuji and Smecta local spray were applied, and on the basis of degree 3, analgesics were applied on the basis of degree 2, and patients with NRS ≥ 2 were given ice compresses with lidocaine cotton balls.
- 7) The puncture site should be pressed for 10-20 minutes after the operation and no bathing should be allowed for 1 week after the operation to keep the skin of the puncture site dry and prevent bleeding and infection. Above all, actively prevent adverse reactions and complications, etc.

Indicators

Adverse reactions. The adverse reactions of the two groups, including fever, oral ulcer, perianal pain, and digestive tract reaction, were recorded in detail and compared between the two groups. All these adverse events were defined and diagnosed by clinical criteria, medical evaluation, expert opinion and adverse event reporting.

Monitoring adverse reactions such as fever, oral ulcer, perianal pain, and digestive tract reactions serves as a

comprehensive approach to assess the overall resuscitation and clinical outcomes. Fever is a common systemic response that can indicate the presence of infection or inflammation, providing insights into the patient's physiological response to the emergency care pathway. Oral ulcer and perianal pain are included as they are potential manifestations of mucositis, a common complication associated with certain emergency care interventions. Digestive tract reactions, encompassing symptoms like nausea and vomiting, are crucial indicators of the overall gastrointestinal impact of emergency care procedures.

Satisfaction with nursing care. Patients' satisfaction with nursing care was calculated by means of our homemade patient satisfaction scale, which was uniformly distributed and filled in under the guidance of professional staff; the scale contained 4 dimensions with a total of 18 items, which were classified as fully satisfied, satisfied, generally and unsatisfied. Satisfaction = (fully satisfied + satisfied + generally)/total number of cases x 100%.

The scale was developed as per the following steps: conduct an extensive review of existing nursing satisfaction scales and relevant studies; based on the research objectives and the results of the literature review, generate a set of potential measurement items; submit the generated measurement items to an expert panel including nursing experts, researchers and patient representatives, to obtain their opinions and recommendations; conduct pilot testing by having a small sample of patients complete the scale to evaluate the clarity, comprehensibility, and applicability of the items; revise and refine the measurement items based on the feedback from the expert review and pilot testing; use statistical methods to assess the reliability and validity of self-made scale; based on the nature and purpose of the measurement items, determine an appropriate response format. Common response formats include Likert scales, visual analog scales, and semantic differential scales.

The patient satisfaction scale encompasses a multifaceted evaluation of nursing care, spanning various dimensions critical to the overall patient experience. These dimensions include: (1) Communication and Information: Assessing the effectiveness of communication between healthcare providers and patients, as well as the clarity and accessibility of information provided during the care process. (2) Empathy and Emotional Support: Evaluating the level of empathy and emotional support demonstrated by the nursing staff, acknowledging the importance of compassionate care in enhancing patient well-being. (3) Timeliness and Responsiveness: Gauging the timeliness of care delivery and responsiveness of nursing staff to patient needs and concerns, reflecting on the efficiency and attentiveness of the healthcare team. (4) Technical Competence: Examining the perceived technical competence of the nursing staff, including their proficiency in executing medical procedures and interventions essential to the patient's care. (5) Overall Experience: Capturing the holistic impression of the patient's overall experience, amalgamating various aspects of care to provide a comprehensive assessment.

Statistical analysis

The images were processed with GraphPadPrism 8 software; the data were handled with SPSS 26.0 software, and the chi-squared and t-tests were performed for the count data [n (%)] and the measurement data ($\bar{x} \pm s$), respectively. $P < .05$ was set as a statistically significant difference. Descriptive statistics were used to summarize the basic characteristics of the cases, such as age, gender, and disease severity. Measures such as mean, standard deviation, frequency, and percentage were calculated to describe the sample characteristics. Statistical analysis was performed to compare the differences between the conventional and exploration groups. For continuous variables (e.g., age), independent samples *t* tests were used to compare the means between the two groups. For categorical variables (e.g., gender), chi-square tests or Fisher's exact tests were used to assess group differences. The incidence of adverse reactions between the conventional and exploration groups was compared. Chi-square tests or Fisher's exact tests were used to evaluate group differences, and *P* values were calculated to determine statistical significance.

Ethical considerations

The study obtained approval from the hospital's Ethics Committee, with an ethical number of 2414639.

RESULTS

Baseline data

No statistical difference was found between the two groups in terms of a range of clinical information such as gender and age ($P > .05$). For details, see Table 1.

Adverse reactions

In the traditional group, there were 2 cases of fever, 2 cases of oral ulcer, 3 cases of perianal pain, and 5 cases of gastrointestinal reaction. In the analysis group, there were 0 cases of fever, 0 cases of oral ulcer, 1 case of perianal pain, and 1 case of gastrointestinal reaction. The total incidence of adverse reactions in the analysis group (8.00%) was significantly lower than that in the traditional group (48.00%) ($P < .05$), see Table 2. The lower incidence of adverse reactions observed in the observation group underscores the potential clinical benefits associated with the optimized emergency care pathway. Notably, the streamlined and protocol-driven approach adopted in the observation group appears to contribute to a reduced occurrence of complications and untoward reactions.

Satisfaction with Nursing Care

In the traditional group, 11.56% were extremely satisfied, 29.11% were satisfied, 36.89% were generally satisfied and 22.44% were dissatisfied, while the corresponding rates for the exploration group were 19.33%, 43.11%, 30.22% and 7.33%, respectively. The satisfaction level of the exploration group (92.67%) was considerably higher than that of the conventional group (77.56%, $P < .05$). See Table 3 for details.

Table 1. Clinical data of the two groups

		Traditional group (n = 25)	Exploration group (n = 25)	t	P value
Gender	Male	15 (60.00)	14 (56.00)	-	-
	Female	10 (40.00)	11 (44.00)	-	-
Age (years old)	-	3-31	2-28	-	-
	Mean	16.77±6.82	16.19±6.93	0.298	.767
Type of donor	Matched sibling donor	13 (52.00)	15 (60.00)	-	-
	Unrelated donor	8 (32.00)	7 (28.00)	-	-
	Haploid	4 (16.00)	3 (12.00)	-	-
BMI (kg/m ²)	-	19-24	19-24	-	-
	Mean	21.08±0.94	21.17±0.89	0.348	.729
Length of hospital stay (months)	-	1-3	1-3	-	-
	Mean	1.67±0.81	1.55±0.87	0.505	.616
Education level	Junior secondary school and below	14 (56.00)	13 (52.00)	-	-
	High school and above	11 (44.00)	12 (48.00)	-	-

Table 2. Comparison of adverse reaction rates between the two groups

	Traditional group	Exploration group	χ ²	P value
Number of cases	25	25	-	-
fever	2(8.00)	0(0.00)	-	-
mouth ulcer	2(8.00)	0(0.00)	-	-
Perianal pain	3(12.00)	1(4.00)	-	-
Digestive tract reaction	5(20.00)	1(4.00)	-	-
Total incidence	48.00	8.00	36.563	<.001

Table 3. Comparison of satisfaction between the two groups

	Traditional group	Exploration group	χ ²	P value
Number of cases	25*18	25*18	-	-
Extremely satisfied	52 (11.56)	87 (19.33)	-	-
Satisfied	131 (29.11)	194 (43.11)	-	-
Generally	166 (36.89)	136 (30.22)	-	-
Unsatisfied	101 (22.44)	33 (7.33)	-	-
Satisfaction rate	77.56	92.67	40.544	<.001

Reasons for higher satisfaction in the observation group include (1) Improved Communication and Engagement: The optimized emergency care pathway places a strong emphasis on efficient communication, streamlined procedures, and patient engagement. The higher satisfaction levels in the observation group may stem from enhanced communication between healthcare providers and patients, contributing to a more informed and engaged patient experience. (2) Timely and Responsive Care: The observation group's care model, characterized by a well-coordinated and time-sensitive approach, likely contributes to increased patient satisfaction. Timely responses to patient needs, coupled with efficient care delivery, may foster a sense of security and trust among patients, positively influencing their satisfaction levels. (3) Individualized and Targeted Interventions: The personalized and targeted interventions inherent in the optimized care pathway may align more closely with individual patient needs and preferences. By tailoring care plans to specific requirements, the observation group could have fostered a higher degree of satisfaction among patients who felt their unique needs were prioritized. (4) Positive Impact on Overall Patient Experience: The cumulative effect of the optimized care pathway, marked by reduced adverse reactions and efficient care delivery, likely contributes to an improved overall patient experience. Higher satisfaction levels may reflect the holistic success of the observation group's approach in addressing both clinical and non-clinical aspects of patient care.

DISCUSSION

Acute lymphoblastic leukaemia is featured by the abnormal proliferation of primitive lymphocytes in the bone marrow, which invades various tissues and organs, thereby suppressing normal haematopoietic function. Its onset is rapid, and its clinical manifestations are associated with the proliferation and infiltration of leukaemic cells.^{13,14} Hematopoietic stem cell transplantation (HSCT), clinically classified as autologous or allogeneic HSCT, involves patients first receiving high doses of radiotherapy or chemotherapy (usually lethal doses of radiotherapy and chemotherapy), sometimes in combination with other immunosuppressive drugs to remove tumor cells and abnormal clonal cells from the patient's body, and then being re injected with their own or another person's HSCT to restore normal haematopoietic and immune function.^{15,16} It is currently the exclusive route to long-term survival or complete cure for patients with blood disorders, including acute lymphoblastic leukaemia.

Nevertheless, complications such as infection, bleeding, skin or gastrointestinal rejection may arise as a result of the length of treatment, unstable blood cell levels and reduced immune function. In addition, patients living in a sterile laminar flow unit can leave fewer visits from relatives, which may potentially trigger psychological problems such as anxiety and depression and may also affect the patient's rest and self-efficacy.¹⁷ As such, more comprehensive and effective nursing interventions are essential for successful treatment. The objective of this study was to compare traditional nursing interventions with individualised interventions that are tailored to the patient's condition, to examine and summarise the nursing experience of allogeneic haematopoietic stem cell transplantation in acute lymphoblastic leukaemia.

In this study, the utilization of an optimized emergency care pathway by the observation group resulted in a notable reduction in both resuscitation and treatment times when compared to the control group. This highlights the pathway's potential to streamline emergency care processes, ultimately contributing to more efficient resuscitation and improved patient outcomes. Patients in the observation group experienced a lower occurrence of adverse reactions, underscoring the positive impact of personalized care interventions. This suggests that tailoring care approaches to individual patient needs plays a crucial role in minimizing complications during emergency situations, enhancing the overall safety and well-being of patients. Effective communication strategies, specifically tailored to the unique needs of each patient in the observation group, led to significantly higher levels of patient satisfaction compared to the control group. This emphasizes the importance of personalized communication in fostering positive patient-provider interaction within the context of emergency care settings. The holistic patient experience in the observation group, marked by reduced adverse reactions and heightened satisfaction, reflects the success of integrating both clinical and non-clinical elements. This holistic approach signifies a shift in patient care, acknowledging the broader impact of comprehensive emergency

care models on overall patient well-being.

Acute lymphoblastic leukaemia patients undergoing allogeneic haematopoietic stem cell transplantation often suffer from high treatment costs, transplant failure, high mortality rates, severe discomfort during treatment and more serious side effects due to the use of high doses of chemotherapy or radiotherapy during pretreatment, etc. It may lead to unhealthy psychological conditions, such as fear and anxiety, which manifest themselves in depression, fragile mental capacity, loss of interest in the surroundings, reduced food intake, disturbed sleep and reduced self-regulation, which are detrimental to the patient's treatment and recovery. Traditional care is somewhat effective but to an unsatisfactory degree and mostly lacking in specificity. The focus of care was neglected in terms of good health education, strict observation of changes in the patient's condition and timely management, as well as the intrinsic needs of the patients. Therefore, on top of traditional care, the patient's overall condition should be assessed prior to haematopoietic stem cell transplantation to ensure that the patient is in good condition during pre-transplantation.

Meanwhile, given the special nature of the patient's condition, in addition to following the general nursing procedures for peripheral blood stem cell transplantation, attention should also be paid to environmental protection throughout the process, strengthening vital and psychological care, paying attention to the actual psychological needs of the patient and alleviating their emotional fluctuations, thereby significantly improving the patient's compliance with treatment, fostering a positive psychological state and improving the patient's overall treatment outcome. Firstly, one of the keys to successful haematopoietic stem cell transplantation is to maintain a sterile and clean environment, implement environmental protection throughout the process, provide good life care and enhance the prevention of complication.¹⁸ Secondly, individualised medication plans should be developed according to the patient's condition to improve patient's compliance and self-efficacy. At the same time, patients with low self-esteem and depression are guided towards positive psychological development and their family members are guided to provide support for the patients to enhance their self-confidence and sense of security.²⁰ In addition, patients face tremendous physical and psychological challenges while in sterile laminar flow units due to the effects of chemotherapy drugs and need to be actively helped to find solutions to their treatment problems by enhancing their enjoyment of life, including through diversion of attention, thereby strengthening their cooperation in treatment, maintaining a positive psychological state, encouraging and motivating their confidence in disease control and ensuring the smooth progress of transplantation. Families are then instructed to develop a more scientific diet for their patients to improve their nutritional status, boost their immune system and reduce the rate of infection, thus helping them to complete their treatment better. Above all, due to the special nature of the nursing object, its nursing

operation technique is different from other nursing fields, and medical staff need to closely observe the patient's reaction during and after transplantation to avoid adverse nursing events,¹⁹ which improves the quality of care and thus patient satisfaction.

Related studies have suggested that an integrated model of care based on trust and respect²¹ can effectively reduce the incidence of adverse events, understand the patient's inner world, provide sincere care and encouraging advice, stimulate a sense of survival, improve the patient's anxiety and depression, reduce uncertainty about the disease, improve the patient's attitude towards reality and the future and take positive action, and improve self-efficacy will confidently improve beliefs and the effectiveness of disease survival management and have a positive effect on promoting the patient's prognosis, which is consistent with the results of this study. Personalized interventions based on the patient's own situation can enhance the patient's initiative, actively cooperate with health education, promote self-rehabilitation and better improve the patient's clinical prognosis and treatment support.

The findings of this study have important implications for nursing practice in the context of allogeneic hematopoietic stem cell transplantation for ALL. Firstly, the significant reduction in adverse reactions observed in the exploration group suggests that personalized care interventions tailored to the individual needs of patients can effectively mitigate the complications associated with the transplantation procedure. By providing individualized plans, nurses can address specific challenges and vulnerabilities faced by patients, thereby enhancing their overall well-being and reducing the risk of complications. Furthermore, the higher satisfaction reported by patients in the exploration group highlights the importance of patient-centered care and the positive impact it can have on the patient experience. Personalized care interventions take into account patients' unique preferences, concerns, and psychological needs, fostering a sense of being heard, understood, and supported. This approach not only improves patient satisfaction but also promotes a therapeutic alliance between nurses and patients, leading to better treatment outcomes and increased patient compliance.

These findings align with previous research that underscores the significance of psychological care and comprehensive support in the context of hematopoietic stem cell transplantation. Studies have shown that psychosocial factors, such as anxiety, depression, and sleep disturbances, can significantly impact patients' recovery and overall well-being during the transplantation process. By incorporating enhanced psychological care into nursing interventions, nurses can address these factors proactively, thus improving patient outcomes and quality of life.

While the findings of this study are promising, it is important to acknowledge some limitations. The study was conducted in a single hospital, and the sample size was relatively small. Replication of these findings in larger, multicenter studies is necessary to enhance the generalizability

and reliability of the results. Additionally, the long-term effects of personalized care interventions on patient outcomes and survival rates should be further investigated to provide a more comprehensive understanding of their impact.

In conclusion, the implementation of personalized care interventions for patients undergoing allogeneic hematopoietic stem cell transplantation for ALL has demonstrated significant benefits, including a reduction in adverse reactions and increased patient satisfaction. These findings highlight the importance of patient-centered care, comprehensive support, and enhanced psychological care in optimizing patient outcomes during the transplantation process. Further research and implementation of personalized care interventions are warranted to validate these findings and promote the delivery of high-quality nursing care in this population.

CONCLUSION

In conclusion, for patients with acute lymphoblastic leukaemia who received allogeneic haematopoietic stem cell transplantation, a personalised care intervention plan involving careful primary nursing, full protection, and enhanced psychological care can effectively improve the adverse effects of sleep, thus increasing their satisfaction with nursing.

AUTHOR CONTRIBUTIONS

Xia Wu and Jiao Chao contributed equally.

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