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Original Article

The application value of informatization-based extended nursing care on discharged children with leukemia

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Abstract: Objectives: This study explored and analyzed the application value of informatization-based extended care on children discharged with leukemia. Methods: 109 children receiving chemotherapy for acute leukemia in our hospital from January 2018 to January 2020 were selected as research subjects. The children were divided into the control group (n=53) and the observation group (n=56) on the basis of admission time point. The control-group children were given conventional nursing measures, and the observation-group children received informatization-based extended nursing care. Patients, self-care ability and their satisfaction with nursing care, and children's quality of life, anxiety and depression between the two groups were compared prior and post intervention. Results: After intervention, the score in each dimension and the total scores of caring abilities in the two groups of patients increased remarkably than those before intervention (*P<0.05*), and the caring skills, health knowledge and the improvement of total score of nursing ability in observation group was more obvious than which in the control group (*P<0.05*). Besides, the score in each dimension and the total scores of the living quality in the two groups of children after intervention increased significantly than those before intervention (*P<0.05*), and the indexes in observation group were remarkably higher than those in control group (*P<0.05*). The scores of anxiety and depression in both groups after intervention were significantly lower than those before intervention (*P<0.05*), and the reduction degree in observation group was greater than that in control group (*P<0.05*). In addition, the satisfaction rate of parents in observation group was notably higher than that in control group (*P<0.05*). Conclusion: The informatization-based extended nursing care can effectively promote the nursing ability of parents on children with acute leukemia, improve the life quality of children and reduce their adverse psychological moods, which is conducive to improving the nursing satisfaction, and is worthy of clinical promotion.

Keywords: Informatization, extended nursing care, leukemia, out-of-hospital nursing care, children

Introduction

The extended care service refers to the medical services, rehabilitative promotion, health guidance and other related services provided for discharged patients with medical care needs, which is an extension of in-patient care, and also a part of holistic nursing care. It can effectively reduce the patient's rehospitalization rate and health service costs, and has good social and economic benefits [1, 2]. At present, the extended care services conducted by Chinese hospitals for children with acute leukemia are primary the traditional methods such as knowledge lectures, mission manuals and telephone follow-up [3, 4], and these measures usually have certain limitations. As parents of children with acute leukemia have a constant need for professional knowledge and professional nursing services, the lack of timely answers will directly increase the psychological anxiety of both parents and children, and even cause delays and miss the best treatment time [5, 6]. If the children have access to timely and effective professional guidance after discharge, it is conducive to improving the quality of nursing service, relieving the negative moods of children and their families and eliminating their doubts on disease, thus beneficial to the improvement of the nurse-patient relationship [7]. The informatization-based extended nursing care refers to a kind of continual nursing

intervention implemented on discharged patients through an informatized mode such as network communication. In this mode, the medical staffs provide a variety of professional disease knowledge and nursing skills to patients through the Internet. In order to further promote the quality of extended nursing services, this study explored and analyzed the application value of informatization-based extended nursing in children discharged with leukemia.

Materials and methods

Clinical data

109 children, who received chemotherapy for acute leukemia in our hospital from January 2018 to January 2020, were selected as research subjects. They were divided into the control group (n=53) and the observation group (n=56) on the basis of admission time point. The research had been approved by the hospital ethics committee.

Inclusion and exclusion criteria

The inclusion criteria: (1) Children diagnosed with acute leukemia by bone marrow cytology; (2) Children aged between 7 to 14 years; (3) Those family members voluntarily signed the informed consent forms and could communicate verbally.

The exclusion criteria: (1) Children with severe psychological or cognitive dysfunction; (2) Children whose families refused to cooperate; (3) Children with severe liver or kidney dysfunction; and (4) The family members did not use WeChat as social tool.

Methods

The control-group children received conventional discharged nursing care, including routine discharge guidance, provision of publicity and education manuals, and followed up by the responsible nurses through telephone three times within 30 days of discharge. In addition, the children were followed up independently in the specialized outpatient department of our hospital.

The observation-group children received informatization-based extended nursing intervention with specific contents as follows: (1) An extended nursing team was funded and standardized training was conducted on the purpose and modalities of extended care. (2) Follow-up records were established at the time of discharge. In addition to routine health education, the nursing staff established WeChat group, and introduced the significance and purpose of the group to the children's families. The group was jointly managed by two professional nursing staff and one chief physician. The professional nursing staff timely popularized the types of drug used and precautions, nursing precautions, nursing and preventive measures for common complications, diet and exercise instructions, and psychological cares, etc. The family members were reminded to report children's condition and medication to the administrator in a timely manner through the WeChat group. At 20:00 every night, the administrator regularly initiated intra-group discussions via voice, picture or video to encourage the family members to actively communicate with each other about living and caring experience, and reminded them of follow-up time according to the electronic archives. At the end of each week, the nursing staff sent nursing related precautions in the form of pictures or words to patients, and repeatedly publicized the common nursing knowledge to improve the patients' caring abilities. Meanwhile, they answered the parents' questions in a timely manner and discussed in the group with the consent of the parents. The parents were encouraged to communicate with each other, and those with preferable caring abilities would introduce nursing experience to the others through WeChat group. At the end of each week, the nurse in charge conducted the follow-up through WeChat or telephone to understand the changes of the children' condition, and encouraged the family members to actively participate in the group, so that more professional nursing information could be obtained.

The observation of indexes

(1) Nursing ability of children's parents [8]: The ability was evaluated through the exercise of self-care agency scale (ESCA). The scale included four dimensions of self-care skills, self-care responsibility, self-concept and health knowledge degree, with a total of 43 items. Each item was scored by a Lokert 5-level scoring

Table 1. Comparison of clinical data between the two groups of children

Group	Number of cases	Gender		Age (years, $\bar{x}$ ± sd)	Disease type		Mother's education level	
		Male	Female		ALL	AML	High school and below	Junior College and above
Control group	53	28	25	10.28	35	18	20	33
Observation group	56	30	26	10.93	32	24	19	37
t/χ^2	-	0.006		1.342	0.910		0.172	
P	-	0.938		0.182	0.340		0.679	

Notes: ALL means acute lymphoblasitc leukemia. AML means acute myelocytic leukemia.

method of 0 to 4 points, and the total score ranged from 0 to 172. The higher scores referred to the stronger care ability of the patients. The internal consistency of the scale, Cronbach's α coefficient, was 0.938.

(2) Living quality of children [9]: The living quality of children was evaluated through the pediatric quality of life inventory measurement models (PedsQL4.0). The scale included four dimensions of physiological function, emotional function, social function and school function, with a total of 23 items. The score of each dimension was the sum of items divided the number of items, and the total score was the sum of items divided the number of items. The full score of the total score and each dimension score were both 100 points, and the higher score indicated the better living quality of children. The coefficient of Cronbach's α of PedSQL4.0 Chinese scale was 0.74-0.82.

(3) Anxiety and depression in children [10]: The children's anxiety and depression were evaluated through hospital anxiety and depression scale (HAD). The scale was divided into two parts, the anxiety subscale (HAD for Anxiety, HAD-A) and the depression subscale (HAD for Depression, HAD-D). Each part contained 7 items and scored by Likert 3 Scoring method of 1 to 3 points, and the total score was 7-21 points. The higher score referred to the more severe degree of anxiety/depression in children. The internal consistency of the HAD scale Cronbach's α coefficient was 0.879.

(4) Patients' satisfaction with nursing after intervention was scored by the nursing satisfaction rating scale made by our hospital. The scale was independently filled out by the children's parents. It contained a total of 20 items, and each item was scored by Likert 5-level scoring method of 1 to 5 points, with a total score of 20 to 100 points. A score of 90-100 was very satisfied, 80-89 was satisfied, and <80 was classified as dissatisfied. The total satisfaction = (very satisfied + satisfied)/total number of cases × 100%.

The statistical analysis

Data processing and analysis were conducted via statistical tool SPSS 25.0. The *t* test was used for comparison of measurement data, and the χ^2 test was used for counting data. The difference was statistically significant under the condition of $P<0.05$.

Results

Comparison of clinical data between the two groups

The difference between gender, age, disease type of children, and the education level of their mothers were observed with no statistical significance ($P>0.05$) (**Table 1**).

Comparison of caring abilities between children's parents in the two groups before and after intervention

After intervention, the score in each dimension and the total scores of caring abilities in the two groups of patients increased remarkably than before intervention ($P<0.05$), and the improvement of caring skills, health knowledge and total score of nursing ability in observation group was more obvious than which in control group ($P<0.05$) (**Table 2**).

Comparison of living quality in the two groups of children before and after intervention

Each dimension score and the total scores of the living quality in the two groups of children

Table 2. Comparison of caring ability score between two groups of patients before and after intervention (points, $\bar{x} \pm s$)

Group	Time	Caring ability	Nursing responsibility	Self-conception	Health knowledge	Total score
Control group (n=53)	Before intervention	21.84±4.27	12.35±3.18	17.94±2.93	41.82±7.95	91.83±13.26
	After intervention	25.93±5.12	17.18±3.43	21.87±3.16	48.27±8.17	115.64±19.72
	Variation	4.17±1.25	4.97±1.31	3.89±0.97	7.21±1.64	23.85±5.64
t		4.466	7.518	6.639	4.119	7.294
P		0.000	0.000	0.000	0.000	0.000
Observation group (n=56)	Before intervention	21.08±3.97	12.74±2.97	17.65±3.10	41.65±8.33	92.03±14.51
	After intervention	30.12±4.08*	17.56±3.64	22.06±3.27	52.82±7.96*	124.27±20.35*
	Variation	9.21±1.47*	4.68±1.51	4.27±1.61	11.63±2.52*	33.42±9.82*
t		11.561	7.469	7.125	7.058	9.391
P		0.000	0.000	0.000	0.000	0.000

Note: Compare with control group, *P<0.05.

Table 3. Comparison of living quality in two groups of children before and after intervention

Group	Time	Physiologic function	Emotional function	Social function	School function	Total score
Control group (n=53)	Before intervention	67.95±7.83	80.92±8.21	81.26±6.82	61.82±7.85	71.82±8.95
	After intervention	75.22±6.40	85.26±7.02	85.34±5.03	66.29±6.92	76.74±8.02
	Variation	7.38±1.74	4.87±0.95	4.38±1.06	5.21±1.28	5.43±0.92
t		5.234	2.925	3.505	3.110	2.981
P		0.000	0.004	0.001	0.002	0.004
Observation group (n=56)	Before intervention	68.01±8.21	80.64±8.11	80.97±6.91	62.06±6.47	72.08±7.92
	After intervention	79.37±9.27*	89.72±9.42*	88.73±4.05*	70.21±7.28*	80.12±8.33*
	Variation	11.64±3.16*	8.93±2.54*	7.85±1.82*	8.13±2.06*	8.12±1.58*
t		6.679	5.318	7.053	6.092	5.092
P		0.000	0.000	0.000	0.000	0.000

Note: Compare with control group, *P<0.05.

Table 4. Comparison of anxiety and depression between the two groups before and after intervention (points, $\bar{x} \pm s$)

Group	Time	Score of anxiety	Score of depression
Control group (n=53)	Before intervention	12.74±1.64	11.08±2.11
	After intervention	9.27±1.06	7.95±1.26
	Variation	-3.41±0.95	-3.27±0.79
t		13.190	9.462
P		0.000	0.000
Observation group (n=56)	Before intervention	12.93±1.77	10.95±2.06
	After intervention	7.21±0.92*	6.22±0.89*
	Variation	-5.84±1.22*	-4.93±0.85*
t		21.458	15.773
P		0.000	0.000

Note: Compare with control group, *P<0.05.

after intervention increased significantly than those prior-intervention (*P<0.05*), and the indexes in observation group were remarkably higher than those in control group (*P<0.05*) (**Table 3**).

Comparison of anxiety and depression between the two groups before and after intervention

The scores of anxiety and depression in both groups after intervention were significantly lower than those pre-intervention (*P<0.05*), and the degrees in observation group dropped significantly than those in control group (*P<0.05*) (**Table 4** and **Figures 1**, **2**).

Comparison of nursing satisfaction of parents between the two groups

The satisfaction of parents in observation group with nursing was notably higher than that in the control group (*P<0.05*) (**Table 5**).

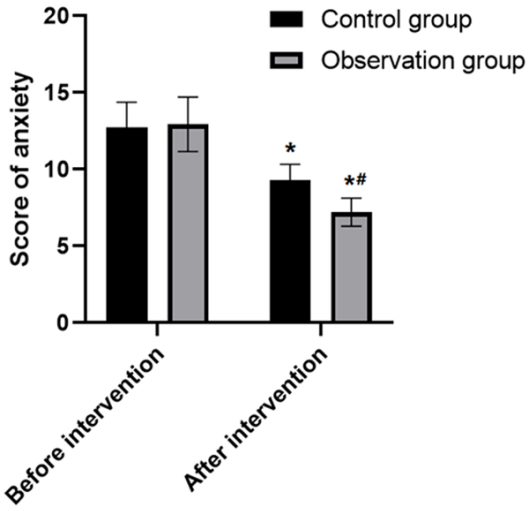

Figure 1. Comparison of anxiety scores between the two groups before and after treatment. Note: Compared with before intervention, *P<0.05; compared with the control group, #P<0.05.

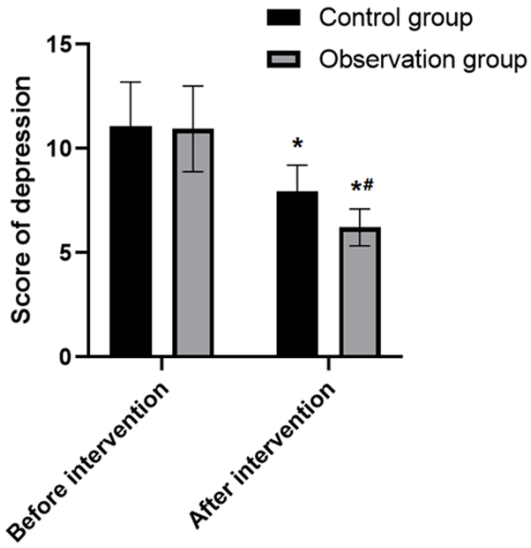

Figure 2. Comparison of depression scores between the two groups before and after treatment. Note: Compared with before intervention, *P<0.05; compared with the control group, #P<0.05.

Discussion

Leukemia is a hematological malignant tumor with highest incidence in childhood, 97% of which are acute leukemia. The incidence and mortality of leukemia are both ranked first in pediatric malignancies [11]. Affected by factors such as young age, poor self-control, and indisposed compliance with doctors, parts of the children failed to receive professional care after discharge, which led to the delay of the disease [12]. In general, children with leukemia need to undergo multiple chemotherapy treatments, and this would cause great physiological and psychological pressure on children and their parents [13]. Therefore, the application of an effective nursing model to reduce the mortality of children and improve their living quality is a crucial matter that needs to be solved urgently. The extended nursing care is an important nursing strategy that connects acute inpatient care and remission of induction rehabilitation, ensuring that the children can receive continuous care after discharge from the hospital [14, 15].

Nowadays, with the development of social informatization, contemporary people have entered into the "thumb era", and WeChat becomes an indispensable new way of communication in daily lives. WeChat, with the Internet as media, has the function of text, pictures, videos and voice transmission. WeChat has features of fast transmission, quick response, zero charge and multi-group chat. It can help better express one's views and feelings, and helps to obtain information and ensure the effectiveness of information transmission [16, 17]. With WeChat as the medium of information transmission, this research carried out informatization-based extended nursing care. The medical staff sent the key points of disease-related care and treatment to the children's families through the WeChat group, and promptly disseminated the related information of acute leukemia in children for them. Such WeChat based nursing model closely connects medical staff, children and their parents together. The publicity materials published regularly in the group, and the group communication with participation of chief physician and professional nurses can realize the zero distance between the patients and the experts. In addition, through the WeChat platform, medical staff can promptly understand the psychological state of children and their parents, and effectively intervene and prevent children from having greater psychological burden and affecting the disease [20, 21]. In addition, medical staff can also record standardized nursing operations and release videos to guide parents to perform more effective cares and improve the professional degree of family nursing [22, 23].

The results of the study showed that the promotion of caring ability in parents in observation

Table 5. Comparison of nursing satisfaction of parents between the two groups [n (%)]

Group	Number of cases	Very satisfied	Satisfied	Dissatisfied	Degree of satisfaction (%)
Control group	53	31 (58.49)	13 (24.53)	9 (16.98)	83.02
Observation group	56	45 (80.36)	9 (16.07)	2 (3.57)	96.43
χ^2	-	-	-	-	5.397
P	-	-	-	-	0.020

group was more obvious than that in the control group after intervention, the improvement of living quality and negative psychological emotion of the observation group were more obvious than those of the control group, and the parents of the observation group were observed with more satisfaction with the nursing care. These results are consist with the fiinding reported by other scholars [24, 25], that comparing to the traditional continuing care, the extended nursing service through informationized WeChat platform is a more effective nursing strategy. It is conducive for parents to control the timeliness of information, and the extended professional cares to patients enable them with more professional nursing skills. Through the close communication, medical staff can more easily grasp the patient's disease status and give timely suggestions, which help to improve the disease prognosis, ease the current strained nurse-patient relationship, thus improving the nursing satisfaction.

Through WeChat, the text, pictures, video, voice and other diversified and real-time effective communication methods are realized, and the information can also be archived for reference. But at the same time, studies by scholars have also shown that parents' satisfaction with WeChat and informatization-based extended nursing care has not seen with a significant increase. The reason may be that the immature management of WeChat group has led to some parents' aversion to the irrelevant information; It may also be due to the fact that the nursing staffs on duty online are dealing with the heavy nursing work at the same time, and have limited time to promptly handle the patients' question. The untimely response has led to the failure of the higher expectations of some parents to get detailed responses in a short time.

To sum up, the informatization-based extended nursing care can effectively promote the nursing ability of parents on children with acute leukemia, improve the living quality of children and reduce their adverse psychological moods, which is conducive to improving the nursing satisfaction, and is worthy of clinical promotion.

Disclosure of conflict of interest

None.

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