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Nurses Knowledge and Practice Regarding Educational Needs for Patients with Leukemia

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Abstract

Aim: The aim was to assess nurses' knowledge and practice regarding educational needs for patients with leukemia.

Design: A descriptive cross-sectional design.

Methods: Two tools were used for data collection, namely as self-administered questionnaire and an observation checklist. The study was conducted at the Oncology and Hematology Department in Zagazig University Hospital.

Sample: Convenience sample of 30 nurses with the only inclusion criterion of having at least one-year experience in the study setting.

Results, conclusion and recommendations: The study demonstrates deficient knowledge and inadequate practices of nurses providing care to patients with leukemia in the study setting. This is most evident in critical areas such as infection control, skin care, and maintaining nutrition. There is also a shortage in training programs for these nurses. Therefore, there is urgent need to arrange continuing education programs for nurses. The study findings could be used as a basis for construction of training endeavors based on identified knowledge and practice gaps to respond to their unmet needs. The main limitation of this study is its small sample size, which would hamper generalization of its results, in addition to the possible observed bias.

Keywords: Leukemia; Knowledge; Practices

Introduction

Leukemia is a malignancy originating in the stem cells of the hematopoietic system, which results in uncontrolled proliferation of white blood cells (WBCs) [1]. The produced WBCs have different grades of immaturity, with inability to perform functions. The is also decreased production of normal red blood cells, white blood cells, and platelets and infiltration of other organs [2]. Leukemia is fatal if left untreated [3].

Leukemia estimated new cases in the United States in 2011 were 44,600 and deaths 21,780 [4]. The number of new cases of leukemia was 13.7 per 100,000 men and women per year. The number of deaths was 6.8 per 100,000 men and women per year. These rates are age-adjusted and based on 2010-2014 cases and deaths [5]. In Egypt, a high incidence was reported, especially in the pediatric population [6]. The National Cancer Registry Damietta Profile [7] registered 52 cases. The cause of leukemia is not known, but multiple factors are thought to be responsible as age, radiation, chemicals, viruses, genetics, cigarette smoking and cancer therapy [8].

Leukemias are classified according to cell line involved lymphocytic or myelocytic, and according to maturity of the malignant cells as acute (immature cells) or chronic (differentiated cells) [9]. In acute leukemia, the onset of symptoms is abrupt, and without treatment, it is fatal within weeks to months. In chronic leukemia, symptoms evolve over a period of months to years, and the disease trajectory can extend for years [10]. Diagnosis is by symptoms [11], confirmed with complete blood count, followed by bone marrow aspiration [12]. Treatment tends to destroy abnormal cells, but can also damage healthy cells and tissues, and it causes side effects [13].

Since the patient with leukemia has many physical and psychological needs, the nursing role is extremely challenging. The diagnosis of leukemia can evoke great fear from death, which makes the patient difficult to manage, and increases his/her need for continued diligent support as well as teaching [14]. Added to this is the patient family need to be informed about treatment and prognosis. Therefore, the nurse must develop a teaching plan with short and long-term goals, specific nursing actions, and periodic evaluation of progress toward goal achievement [15]. The satisfaction of basic human needs enhance wellness conversely [16] whereas the unmet needs can result in a client's altered health status [17]. For nurses, it is imperative that these physical, psychological, social, and educational patients' needs be met [18]. Moreover, they should be sensitive to the information-seeking behavior of cancer patients and their families [19].

Significance and of the Study

Cancer occupies the second place after heart disease as a cause of death. The researchers observed that a large number of leukemia patients are admitted to the hematology unit where they work. Those

patients have knowledge deficit about the disease manifestation, treatment and follow-up care. This indicates a need to know how far the nurses in the setting know and fulfill their roles towards these patients to optimize independence in daily living activities, prevent complications of the disease and its treatment, and attain remission.

Aim

The aim was to assess nurses' knowledge and practice regarding educational needs for patients with leukemia.

Methods

Design

A descriptive cross-sectional design was used which was conducted in Oncology and Hematology Department at Zagazig University Hospital.

Sample

The study involved a convenience sample of 30 nurses with the only inclusion criterion of having at least one-year experience in the study setting. Since these were all the nurses available in the setting, no sample size could be calculated.

Data collection

Two different tools were used for data collection, namely as self-administered questionnaire and an observation checklist.

The self-administered questionnaire was designed by the researchers for assessment of nurse's knowledge of the educational needs of the patient with leukemia. It was constructed in Arabic language based on pertinent literature [20]. It included a section for nurse's demographic characteristics as age, gender, nursing qualification, years of experience both total and in oncology department, and previous attendance of training in leukemia. The second section consist of 63 multiple-choice question assessing nurse's knowledge of blood components, definition of leukemia, its causes, types, clinical manifestations and treatment, as well as nurses' role in management of the patient and in meeting patient needs. For scoring, each correct response was scored one and the incorrect zero. For each area of knowledge, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score of the part. These scores were converted into percent scores. The nurse was considered to have satisfactory knowledge if the percent score was 60% or more and unsatisfactory if less than 60%.

The observation checklist was also designed by the researchers to assess nurse's performance of her role in meeting daily needs of the patient with leukemia. It was based on pertinent literature [21]. These needs included the following.

Personal hygiene and skin care: 12 items such as "Use warm water and mild soap for skin care," "Use only approved lotions and creams on the skin."

Prevention and control of infection: 9 items such as "Maintain protective isolation," "Maintain meticulous hand washing before and after every procedure."

Control bleeding and prevent injury: 10 items such as "Instruct patient to avoid gum bleeding hygiene by using soft tooth brushes," "Teach client to avoid forceful coughing, sneezing, and nose blowing."

Maintaining adequate balanced nutrition: 16 items such as "Provide liquids with different textures and tastes," "Offer small frequent meals including low-fat high-calories foods throughout the day."

Control of side effects of lines of treatment: These included small checklists for dealing with anemia (4 items), fatigue (6 items), diarrhoea (10 items), constipation (6 items), alopecia (5 items) and stomatitis (5 items).

The checklist items were checked as either "done" or "not done." For scoring, the items observed "done" were scored one and the items "not done" were scored zero. For each area, the scores of the items were summed up and the total divided by the number of the items, giving a mean score of this part. These scores were converted into percent scores. The nurse's practice was considered adequate if the percent score was 60% or more and inadequate if less than 60%.

Upon preparation of the checklists, they were presented to a panel of five experts (three professors in Medical-Surgical Nursing, Faculty of Nursing, Ain Shams University, and an assistant professor and a lecturer of Oncology Medicine and Hematology, Faculty of Medicine, Zagazig University) for face and content validation. They reviewed the tools for clarity, relevance, comprehensiveness, understanding, applicability and ease of administration. Minor modifications were required.

Pilot study

A pilot study was conducted on five nurses from another setting for testing clarity, arrangement of items, content applicability, and timeframe. The necessary modifications were done. The pilot subjects were not included in the main study sample.

Study manoeuvre

After securing all necessary permissions using official channels, the researchers visited the setting and met with the administration to explain the purpose of the study and its procedures. Then, they met with the eligible nurses, explained to them the aim and process of the study and invited them to participate. Those who consented to participate were handed the self-administered questionnaire with instructions in filling it. This took 20 to 30 min from each nurse. Once completed, the form was collected and the nurse was instructed that she will be observed during her routine daily work.

Participant observation technique was used to avoid any observer bias. The process of observation was done during the morning shift and lasted for many days for each nurse to complete all the checklists. Morning shift was suitable for the researchers because it was easy to find the nurses on this shift. Moreover, follow-up and basic care and procedures to patients are mostly done during this shift, and there was no interruption from visitors. Data collection was carried out over three months from August to October 2010.

Data analysis

Data entry and Statistical analysis were done using SPSS 20.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations for quantitative

variables. Qualitative categorical variables were computed using chi-square test. Whenever the expected values in or more than one of the cells in 2 × 2 tables was less than 5, Fisher exact test was used instead. Statistical significance was set at $p<0.05$.

Results

The nurses in the study sample were mostly (53.3%) in the age group 30-<40 years (Table 1). Only 2 (6.7%) were having a bachelor degree in nursing. Their total experience years ranged between two and 29 years, with mean 12.7 years. The majority (76.7%) was working in oncology for more than three years. Only about one-fourth (26.7%) had previous training in leukemia.

	Frequency	Percent
Age (years)		
<20	3	10
20-	7	23.3
30-	16	53.3
40+	4	13.3
Nursing qualification		
Nursing school diploma	23	76.7
Technical school diploma	5	16.7
Bachelor of nursing degree	2	6.7
Total years of experience		
<10	11	36.7
10+	19	63.3
Range	2.0-29.0	
Mean ± SD	12.7±7.0	
Experience years in oncology department		
<=3	7	23.3
>3	23	76.7
Attended training course about leukemia	8	26.7

Table 1: Personal characteristics of studied nurses (N=30).

Table 2 demonstrates a wide variation in nurses' knowledge of blood components and functions. While 90.0% of them had correct knowledge of the definition of increased immature WBCs count, only 20.0% knew the number of platelets, and 30.0% knew the functions of WBCs. As regards nurses' correct knowledge of leukemia; it was generally high reaching 100.0% for primary diagnosis, side effects of chemotherapy, and aim of repeated blood transfusion. Conversely, only 13.3% correctly knew the purpose of chemotherapy, and 26.7% knew gender susceptibility.

Correct knowledge of	Frequency	Percent
blood components and functions:		
Number of WBCs	13	43.3
Functions of WBCs	9	30
Causes natural increase of WBCs count	26	86.7
Definition of increase immature WBCs count	27	90
Number of Platelets	6	20
Functions of Platelets	26	86.7
Leukemia		
Definition	26	86.7
Risk factors	25	83.3
Age susceptibility	14	46.7
Gender susceptibility	8	26.7
Manifestations	26	86.7
Primary diagnosis	30	100
Purposes of bone marrow biopsy	27	90
Precautions in bone marrow aspiration in leukemia	25	83.3
Purpose of CBC in leukemia	28	93.3
Precautions after vein puncture in leukemia	24	80
Methods of treatment	25	83.3
Chemotherapy		
Definition	22	73.3
Purpose	4	13.3
Routes	27	90
Precautions before	29	96.7
Side effects	30	100
Contraindicated drugs in leukemia	19	63.3
Bone marrow transplantation		
Definition	20	66.7
Sources	27	90
Repeated blood transfusion		
Aim	30	100
Role of the nurse in blood transfusion	26	86.7

Table 2: Knowledge of blood components and functions and of leukemia among nurses in the study sample (n=30).

As illustrated in Table 3, nurses' knowledge of their role in the care of patient with leukemia was generally high. The areas with highest percentages of correct knowledge were those of general nursing care (100.0%), nursing role in oral complications (100.0%), nursing care of hyperthermia (96.7%), nursing care of alopecia (96.7%), definition of anemia (96.7%), and patient and family education (96.7%). On the contrary, the lowest percentages of correct knowledge were related to precautions to prevent infection (6.7%) and nursing care for skin complications (23.3%).

Correct knowledge of nurse role	Frequency	Percent
General care		
Nursing care	30	100
Pain relief	27	90
Prevention of infection		
Causes of increase infection susceptibility in leukemia	27	90
Signs and symptoms of infection	23	76.7
Nursing management regarding infection control	25	83.3
Precautions to prevent infection	2	6.7
Vital signs		
Most important vital signs measuring for leukemia	26	86.7
Best site to measure body temperature	15	50
Causes of hyperthermia in leukemia	29	96.7
Care of hyperthermia in leukemia	29	96.7
Nutrition		
Nutritional requirements for patient with leukemia	28	93.3
Causes of malnutrition in leukemia	28	93.3
Improving nutritional status of patient with leukemia	27	90
Skin complications		
Types of skin complications in leukemia	25	83.3
Nursing care of alopecia	29	96.7
Nursing care of skin complications	7	23.3
Anemia		
Definition of anemia	29	96.7
Causes of anemia	25	83.3
Symptoms of anemia	23	76.7
Nursing management of anemia	22	73.3
Controlling bleeding in patient with leukemia	26	86.7
Gastrointestinal complications		
Types of oral complications in leukemia	29	96.7
Nursing role in oral complications	30	100
Nursing role in nausea and vomiting	28	93.3
Nurse role regarding anal care	28	93.3
Patient and family education	29	96.7

Table 3: Knowledge of nurse role in leukemia among nurses in the study sample (n=30).

In total, Table 4 demonstrates that the lowest area of satisfactory knowledge was related to blood components and functions (60.0%), while the highest was related to nursing role (83.3%). Overall, 70.0% of the nurses had satisfactory total knowledge.

Total satisfactory (60%+) knowledge	Frequency	Percent
Blood components and functions	18	60
Leukemia	23	76.7
Nursing role	25	83.3
Total knowledge		
Satisfactory	21	70
Unsatisfactory	9	30

Table 4: Total knowledge of nurse role in leukemia among nurses in the study sample (n=30).

Concerning nurses' practice, Table 5 shows that the lowest percentage of adequate practice was in the area of control of infection (20.0%). Conversely, the area with the highest percentage of practice was that of control of side effects of medications (73.3%). In total, two-thirds of the nurses (66.7%) were having adequate practice.

Adequate (60%+) performance	Frequency	Percent
Maintaining personal hygiene and skin integrity	21	70
Control of infection	6	20
Measures for controlling bleeding tendency	10	33.3
Maintaining balanced nutrition	11	36.7
Controlling the side effects of medications:		
Anemia	25	83.3
Fatigue	21	70
Diarrhea	23	76.7
Constipation	23	76.7
Alopecia	21	70
Stomatitis	19	63.3

Table 5: Performance of nurse role in leukemia as observed among nurses in the study sample (n=30).

Table 6 points to no statistically significant relations between nurses' total knowledge and any of their demographic characteristics. It also indicates no statistically significant association between nurses' total knowledge and practice.

	Knowledge				Test	p-value
	Satisfactory		Unsatisfactory			
	No.	%	No.	%		
Age (years)						
<30	6	60	4	40		

30-	15	75	5	25	Fisher	0.662
Nursing qualification						
Bachelor	1	50	1	50		
Diploma	20	71.4	8	28.6	Fisher	0.999
Total experience years						
<10	5	45.5	6	54.5		
10+	16	84.2	3	15.8	Fisher	0.071
Experience years in oncology						
<=3	5	71.4	2	28.6		
>3	16	69.6	7	30.4	Fisher	0.999
Attended training courses in leukemia care						
No	16	72.7	6	27.3		
Yes	5	62.5	3	37.5	Fisher	0.905
Total practice						
Adequate	15	75	5	25		
Inadequate	6	60	4	40	Fisher	0.663

Table 6: Relations between nurses' knowledge of and their personal characteristics and their performance.

Similarly, Table 7 demonstrates no statistically significant relations between nurses' total practice and any of their demographic characteristics. Although more of the nurses who had no previous training in leukemia had adequate practice, the difference did not reach statistical significance (p=0.113).

	Practice				Test	p-value
	Adequate		Inadequate			
	No.	%	No.	%		
Age (years)						
<30	6	60	4	40		
30-	14	70	6	30	Fisher	0.879
Nursing qualification						
Bachelor	1	50	1	50		
Diploma	19	67.9	9	32.1	Fisher	0.999
Total experience years						
<10	7	63.6	4	36.4		
10+	13	68.4	6	31.6	Fisher	0.999
Experience years in oncology						
<=3	5	71.4	2	28.6		
>3	15	65.2	8	34.8	Fisher	0.999
Attended training courses in leukemia care						
No	17	77.3	5	22.7		
Yes	3	37.5	5	62.5	Fisher	0.113

Table 7: Relations between nurses' performance of and their personal characteristics.

Discussion

Nurses working with patient who have cancer have a significant supportive role in helping the patient and their families to understand various therapies, preventing or managing side effects, and observing for late effects of treatments. Education is a constant feature of the nursing role especially in terms of new treatments, clinical trials and homecare [22]. Adherence to treatment is largely dependent on patient and family teaching [23]. The present study aim was to identify nurses' role regarding educational needs for patients with leukemia. The findings indicate a wide variation in nurses' knowledge and practice, with no relations between them.

The study sample included a majority of diploma degree nurses. This reflects the actual situation in the study setting, where there is a lack of highly qualified nurses. This might be explained by the preference of most bachelor degree nurses to work in academia or in other specialties that could be less distressing. It might also be related to that the majority of the nurses were from an older generation, as the total years of experience exceeding ten years indicate. At that time, the majority of the nurses were diploma-degree ones.

According to the present study findings, only approximately one-fourth of the nurses reported having had training courses related to leukemia care. This might be one of the causes underlying the lack of knowledge and skills among these nurses. Similar findings were described in studies at Ain-shams University Hospitals [24] and at Zagazig University Hospitals [25]. Nonetheless, the present study could not reveal any association of statistical significance between nurses' knowledge and practice from one side and their attendance of training courses from the other side. The lack of statistical significance might be due to the small sample size, but could also be related to the content and process of such training and the willingness of participants to actively share and get the most benefits. Thus, in disagreement with this present study finding, a randomized controlled trial in Japan demonstrated the beneficial effect of a training program on the knowledge and practice of oncology nurses [26].

The current study a wide variability of nurses' knowledge of blood components and functions. This was particularly evident in their lack of knowledge of the number of platelets, and the functions of WBCs. This is expected given the majority of diploma nurses in the study sample, since diploma degree programs may not give much emphasis to basic sciences. However, the number of platelets should be better known since this is a basic investigation for leukemia patients, and they should deal with it in their daily care. Such lack of knowledge has been related to lack of patient adherence and compliance to medications in a study carried out in Australia [27].

Meanwhile, the present study nurses' knowledge of leukemia was generally high. The main areas of deficient knowledge were related to

age and gender susceptibility, as well as the purpose of chemotherapy. The lack of knowledge about susceptibility is not as important for these nurses as the lack of knowledge about the purpose of chemotherapy since this is a major part of their care, and they should have better knowledge of it. Nonetheless, the lack of knowledge about susceptibility, causes, and risk factors of leukemia is not directly influencing the quality of care these nurses provide to patients who already have the disease. Moreover, the etiology of leukemia and many other chronic diseases is still not well-established [28].

The present study findings have also demonstrated generally high nurses' knowledge of their role in the care of patient with leukemia. Few areas had low percentages of correct knowledge, and these were concerning the precautions to prevent infection, and nursing care for skin complications. These two areas are critical given the high susceptibility of the patients with leukemia to infection and skin problems. In congruence with this, Lachance et al. [29], in a study in Canada, reported that the patients with chronic lymphocytic leukemia are highly susceptible to infections, which would have negative impacts on their morbidity and mortality. Therefore, these authors suggested immunoglobulin replacement therapy for prevention and management of infections. In agreement with our finding, a recent study in South Africa reported a similarly low level of knowledge about infection control among nurses [30].

Overall, almost three-fifth of the nurses in the current study had total satisfactory knowledge. This is not very comforting finding since still two-fifth have unsatisfactory knowledge, which could have a negative impact on the quality of care they provide to their patients with leukemia. This is why the Leukemia and Lymphoma Society in the United States is deploying efforts in improving professionals' knowledge of leukemia s and other malignant blood diseases. It offers free professional development and education seminars to nurses and other professionals [31].

Moreover, the lack of knowledge was universal among the nurses in the present study sample regardless age, qualification, experience, or previous training as shown by the lack of significant associations with any of these variables. In agreement with this, Sarani et al. [32], in a study in Iran, found no significant relations between nurses' knowledge and any of their personal characteristics. Moreover, Maghawry [33] in a study at Zagazig University Hospital reported that years of experience had no significant relations with nurses' knowledge. Conversely, El Sayed [34] reported a significant association between nurses' knowledge and their years of experience. The lack of significant relation in our study could be due to the small sample size, which is a main study limitation.

The present study has also investigated nurses' practice of their role in caring for patients with leukemia. The main deficient practice was related to their role in the control of infection. This is an alarming finding given the high susceptibility of these patients to infection. This is certainly due to their deficient knowledge in this area as the study findings indicated. This demonstrates the need for educational interventions for these nurses to improve their knowledge of infection control, which would consequently have a positive impact on their related practices. Given the importance of infection control and prevention in cancer patients on chemotherapy, van Dalen et al. [35] in a study in Amsterdam assessed the value of low-bacterial diet for prevention of infection in such patients. However, the issue needs further research.

Totally, two-thirds of the nurses in the study sample demonstrated adequate practice. Their practice was not significantly related to any of their personal characteristics. Moreover, it had no significant relation to their total knowledge. Again, this might be due to the small sample size in our study. However, the findings are in congruence with Mohammed [36] and Saleh [37] who, in two studies at Zagazig University Hospital, found no significant relation between nurse's knowledge and practice. On the same line, studies in Jordan [38] and in Nigeria [39] demonstrated a gap between nurses' knowledge and practice.

Conclusion and Recommendations

The study demonstrates deficient knowledge and inadequate practices of nurses providing care to patients with leukemia in the study setting. This is most evident in critical areas such as infection control, skin care, and maintaining nutrition. There is also a shortage in training programs for these nurses. Therefore, there is urgent need to arrange continuing education programs for nurses. The study findings could be used as a basis for construction of training endeavors based on identified knowledge and practice gaps to respond to their unmet needs. The main limitation of this study is its small sample size, which would hamper generalization of its results, in addition to the possible observed bias.

Ethical Aspects and Conflict of Interest

All necessary permissions were obtained from the hospital director and nursing director of Zagazig University Hospital. Official letters were issued to them from the Faculty of Nursing explaining the aim of the study to obtain permission for collection of data. The study proposal was approved by the research ethics committee at the Faculty of Nursing, Zagazig University. An oral informed consent was obtained from nurses to participate in the study. They were assured about their rights to refuse or withdraw at any time. Complete privacy total confidentiality of any obtained information was ensured. The study procedure could not have any harm on participants.

Author Contribution

The first author (correspondent author): contributed to the conception of the research, the development of the tools, statistical analysis, and commentary on the tables, wrote the discussion and references, prepared the patient protocol and help in data collection. The second author contributed to the sample collection, provided the pre, post and follow-up test, applied the protocol on patients, and participated in the reference collection and analysis data. The third author contributed to the translation of the tools and booklet into Arabic, participated in the reference collection and data collection and administered the protocol.

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