

Effect of Teaching Program for Patients with Leukemia on Their Self-careJehan S. Ali Sayyed¹ and Ahmed G. Mohamed Eissawy²¹Adult Care Nursing Department, Faculty of Nursing El - Minia University²Hematology Department, Faculty of Medicine, El - Minia Universityjeahan_sayyed@yahoo.com

Abstract: Leukemia is a life-threatening illness that significantly affects a patient's physiological, psychological, and social well-being. The main **objective**; of this study was to evaluate the effect of the educational program for patients with leukemia on their self-care. The **research hypothesis**; educational program will affect positively on self-care for patients with leukemia. The **Methods**: The study was conducted in the Institute of Oncology in Minia Governorate. Quasi-experimental research design was utilized in this study on 37 adult patients their age between 18-55 years old, from both sexes with acute or chronic leukaemia. **Four tools** were used to collect the data in this study, tool one: Interview questionnaire sheet were included biosocial demographic data and knowledge assessment sheet .tool two: Observational checklist .tools three: Self-care questionnaire. Tool four: Teaching program sheet .**The Results** of the study documented that there were a significant improvement in patients knowledge and practices ($p < 0.00$ of most items) after implementation of educational program. In **conclusion**, education of patients is necessary to achieve an optimum level of functioning. Replication of this study on larger probability sample is highly **recommended**.

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1. Introduction

Leukemia is a group of malignant disorders of white blood cells. In leukemia, the usual ratio of greater numbers of red blood cells than white blood cells is reversed. Bone marrow is gradually replaced by immature, abnormal cells. Eventually, these abnormal cells spill into the circulation and invade other organs such as the liver, spleen, and lymph nodes. If the disease is not treated, leukemic cells replace all normal blood cells, leading to death (*Burke, LeMone, Mohn-Brown & Eby, 2007*).

Approximately 28,900 new cases of leukemia occur each year in the United States, and the numbers have been increasing over the past three decades (*Phipps, Marek, Monahan, Neighbors, Sands & Green, 2009*). Although often thought of as a disease of children, the number of adults affected with leukemia is 10 times that of children (*Lewis, Heitkemper & Dirksen, 2009*).

At Institute of Oncology in Minia Governorate, the number of patients admitted were 300 patients during the year 2010 (*Statistical Unit, Institute of Oncology in Minia Governorate, 2010*).

Although the cause of most leukemias is unknown, certain risk factors have been identified. People with certain genetic disorders such as Down syndrome have a higher incidence of leukemia. Environmental risk factors play a role as well. Risk factors for myeloid leukemia include cigarette smoking and chemicals such as benzene. Exposure to ionizing radiation increases the risk for several types

of leukemia. Patients who have undergone treatment for cancer have an increased risk. The human T-cell leukemia virus-1, a retrovirus, is known to cause certain leukemias (*LeMone & Burke, 2008*).

Leukemia can be classified as acute or chronic and by the cell type, if lymphocytes or their precursors in the bone marrow are the malignant cell type, the term lymphocytic is used. For abnormalities of myeloid stem cells in the bone marrow, the term myelocytic is used (*Rodgers, 2008; and Misaghian et al., 2009*).

Acute leukemia is characterized by abrupt onset and rapid progression. Chronic leukemia has a gradual onset, a prolonged clinical course, and relatively long survival (*Daniels, Nosek & Nicoll, 2007*). The most common signs and symptoms are fever, sweats, bone pain, weight loss, malaise, fatigue, bruising, gingival bleeding, epistaxis and splenomegaly (*Swearingen, 2003; and Gates, Fink & Scheetz, 2008*). Diagnosis of leukemia is usually confirmed with bone marrow examination (*Burke, LeMone, Mohn-Brown & Eby, 2007*).

Treatment of leukemia as stated by *Daniels, Nosek & Nicoll (2007) and The National Cancer Institute (NCI) (2009)* may include supportive therapy, chemotherapy, radiation therapy, bone marrow or stem cell transplantation, immunotherapy, target therapy, and surgery to remove an enlarged spleen (*Black & Hawks, 2005*). The most effective treatment for leukemia is chemotherapy, which may involve one or a combination of anticancer drugs that

destroy cancer cells (*Lewis, Heitkemper & Dirksen, 2004*). Therapies of leukemia have undesirable side effects. Nursing care focuses on the physical and psychosocial effects of the disease and its treatment (*Burke, LeMone, Mohn-Brown & Eby, 2007*).

Self-care, learned behavior with deliberate actions responding to need, includes activities an individual performs to maintain health (*White, 2005*). Nurses are in key positions to facilitate the achievement of self care which requires sophisticated communication skills, teaching skills, specialized knowledge and an awareness of the multiple factors affecting nurse-patient relationship during the provision of care (*Parissopoulos & Kotzabassaki, 2004*).

The diagnosis of leukemia often brings with it the need to make difficult decisions at a time of profound stress for the patient and family (*Lewis, Heitkemper & Dirksen, 2004*). Nurses encounter patients during times of major health changes and are in key positions to help them make decisions and adopt behaviors that greatly alter health (*Black & Hawks, 2005*). Fortunately, counseling can help improve coping and decision-making skills (*American Society of Clinical Oncology, 2009*).

Education is the process of helping a patient to recognize and cope with stressful psychological or social problems, to develop improved interpersonal relationships and to promote personal growth. It involves providing emotional, intellectual and psychological support to patients. Nurses are responsible for initiating, updating, and reinforcing patients learning. They must also design strategies that will sustain necessary motivation for patients to maintain a maximum quality of self-management throughout their lives (*Lenone, 2000; and Larsen, Hughes & Dewees, 2001*).

Aim of study

To investigate the effect of program for Patients with Leukemia on Their Self-care

2. Subjects and Method

Setting:

The study was conducted in the Institute of Oncology at Minia Governorate

Subjects:

The sample of this study comprised on 37 adult patients their age between 18-55 years old, from both sexes with acute or chronic leukaemia and patients with chronic illness were excluded from the study.

Research Design:

A Quazi experimental research design will be utilized. But uses nonrandomized groups to fulfill the aim of the study

Research Hypothesis

Educational program will affect positively on self-care for patients with leukemia

Tools:

Four tools were used to collect the data for this study

First Tool:

An Interview Questionnaire Sheet, it included two parts

1st part covering Biosocial and demographic data of the patient as age, sex, level of education, marital status, occupation,etc.

2nd part included Pre/Post knowledge assessment sheet covering the following items: anatomy and physiology of blood, definition, risk factors, clinical manifestations, diagnostic measures and strategic plan of leukemia management.

Second Tool:

(Observational checklist for the performance of the basic skills for patients with leukemia :

It was developed by the researcher to assess the patient's performance before and after the educational program regarding to temperature measurement, oral care, breathing exercises as well as range of motion (ROM) exercise

Third Tool:

Self-care questionnaire for patients with leukemia

It was designed to measure self-care for patients under study before and after the educational program.

Tools four:

Involve educational program booklet for patients with leukemia focusing on self-care It was designed in Arabic Language to help patients with leukemia to acquire knowledge about anatomy and physiology of blood, definition, risk factors, clinical manifestations....etc. It covers the knowledge related to self-care management that include avoidance of infection and bleeding, follow the dietary regimen, perform breathing and ROM exerciseetc., It also covers the practice related to self-care management that include oral care, temperature measurement, breathing exercises, and ROM exercise. The educational program booklet was developed based on patients' identified needs. However, during individual sessions.

Methods

- Permission to conduct the study was obtained from the responsible authorities of Institute of Oncology after explanation of the aim of the study.
- Development of the tools after reviewing the related literature was done
- The tools were reviewed by a jury for clarity, feasibility, applicability, and the content validity of the tools and all the necessary modifications were done, the Jury members were five experts. Professional medical-surgical Nursing and

Haematological and appropriate modification was done.

-A pilot study was conducted on a number of 10% from patient's size to test the clarity and feasibility of assessment sheet and tools accordingly, the necessary modifications were done.

-Data pertinent to the study will be collected through interview and a direct observation will be utilized for data collection.

Procedure:

The volunteers read a detailed description of the protocol and provided a written informed consent was obtained from each participating patients to be included in study clarification of the nature and purpose of the study was done on initial interview with each patients. The researches filled the data collection tools within 45-60 minutes.

Patient's socio-demographic characteristics and medical data were filled pre educational program implementation while problems as expressed by patients, knowledge, skill performance, and self-care were filled pre educational program implementation and after 4 weeks from the last educational session.

Educational program is done in the following manner: Each patient was interviewed and educated individually by the researcher in the patient's room. The number of sessions ranged from three to five sessions according to patient's needs; each session lasted from 45-60 minutes. Each patient should be informed with date, time and place of follow-up session.

Statistical method:

Collected data were verified prior to computerized data entry. Descriptive statistics were calculated (e.g., frequency, percentage, mean and standard deviation). Testing hypotheses was applied to check the significance of differences between levels (scores) before and after application of the protocol.

Chi square, NOVA test and P-value (probability to reject a correct null hypothesis or type I Error) was considered if P-value is less than 0.05.

3. Results

Part I: Socio-demographic Characteristics of Patients under Study, History of Patients, and Smoking Habits.

Table (1), shows that, the mean age for patients included in the study were 33.54 ± 12.02 , while more than half of patients (54.1%) were females while 45.9% of them were males.

Regarding to patients' occupation, almost three fifths of patients (62.2%) were housewives, retired or students, while 35.1% were professionals. In relation to marital status, more than three fifths of

patients were married (62.2%) and (37.8%) were single.

Concerning the educational level of the patients included in the study, slightly more than one fifth of them (21.6%) were illiterates, while more than half of them (56.8%) can read/write or had basic/intermediate education, as well as 21.6% of them were highly educated. Also half of them (50%) have family history of breast cancer and the other half (50%) have history of leukemia.

Table (1): Number and percentage distribution of socio-demographic characteristics among patients under study, n= 37.

Items	No.	%
Age (In years):		
<25-	21	56.8
35-	7	18.9
45+	9	24.3
Range	18-55	
Mean \pm SD	33.54 \pm 12.02	
Gender:		
Male	17	45.9
Female	20	54.1
Job:		
Professional	13	35.1
Administrative	1	2.7
Housewife/retired/student	23	62.2
Marital status:		
Single	14	37.8
Married	23	62.2
Education:		
Illiterate	8	21.6
Read/writeand Basic/intermediate	21	56.8
High	8	21.6
Residency:		
Town	21	56.8
Village	16	43.2
Per capita monthly income (LE):		
<300	16	43.3
300-	11	29.7
600+	10	27.0
Family history of neoplasm		
Type: Breast cancer	1	50.0
Leukemia	1	50.0

Table (2): Number and percentage distribution of smoking habit among patients under study, n= 37.

Items	No.	%
Non-smoker	31	83.8
Quit-smoking	6	16.2
Passive smoking		
Exposed	23	62.2
Not exposed	14	37.8

The above table shows that, the majority of patients (83.8%) were non-smokers, while more than three fifths of them (62.2%) were exposed to passive smoking and 16.2% of them were quitted smoking.

Table (3): Number and percentage distribution of disease characteristics among patients under study, n=37.

Items	No.	%
Duration of leukemia (In months):		
<6	27	73.0
6+	10	27.0
Duration of hospital stay (In days):		
<5	18	48.7
5-< 9	11	29.7
9+	8	21.6
On chemotherapy:		
Yes	26	70.3
No	11	29.7
Duration on chemotherapy (In weeks)		
<8	11	42.3
≥8	15	57.7

Table 3 shows duration of leukemia and its treatment among patients in the study. Results revealed that, approximately three quarters of patients (73.0%) had leukemia for less than 6 months.

In relation to duration of hospitalization, less than half of patients (48.7%) were hospitalized for less than 5 days, while more than one quarter of them (29.7%) were hospitalized for 5- < 9 days and only 21.6% of them were hospitalized for 9 days or more. In relation to chemotherapy treatment 70.3% of patients were on chemotherapy and 42.3% of them were on chemotherapy for less than 8 weeks.

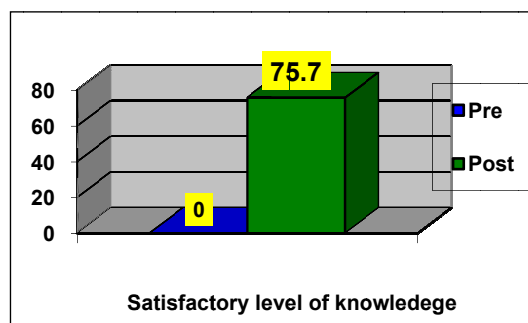


Fig. (1): Effect of educational program for patients under study on their satisfactory level of knowledge. Regarding to satisfactory level of knowledge, slightly more than three quarters of patients under study (75.7%) had satisfactory level of knowledge about blood and leukemia with statistically significant difference post program implementation.

Table (4): Effect of Educational program for patients under study on their skill performance.

Items	Pre (n=37)		Post (n=37)		Z-test	Sig.
	No.	%	No.	%		
Oral care:						
Inadequate	34	91.9	10	27.0	7.6	*
Adequate	3	8.1	27	73.0		
Measuring of body temperature:						
Inadequate	22	59.5	9	24.3	3.3	*
Adequate	15	40.5	28	75.7		
Deep breathing exercise:						
Inadequate	37	100	10	27.0	10	*
Adequate	0	0.0	27	73.0		
Deep breathing and effective coughing exercise:						
Inadequate	37	100	12	32.4	8.8	*
Adequate	0	0.0	25	67.6		
Range of motion:						
Inadequate	37	100.0	10	27.0	10.0	*
Adequate	0	0.0	27	73.0		
Total :						
Inadequate	37	100.0	12	32.4	8.8	*
Adequate	0	0.0	25	67.6		

* Significant

Table (4) represents skill performance as regards oral care, measuring of body temperature, breathing exercises, and range of motion, all patients (100%) in the study had inadequate performance regarding to breathing exercises and range of motion. Most of them (91.9%) had inadequate performance regarding to oral care, while slightly less than three fifths of them (59.5%) had inadequate performance regarding to measurement of body temperature pre program implementation.

However post program implementation, slightly more than three quarters of patients under study (75.7%) had adequate performance regarding to measurement of body temperature, 73% for oral care, deep breathing exercise and range of motion. While slightly more than two thirds of them (67.6%) had adequate performance regarding too deep breathing and effective coughing exercise.

There were statistically significant differences among the study group regarding adequacy of performance of skills post educational program implementation.

All patients (100%) pre educational program implementation had unsatisfactory self-care regarding to following the dietary regimen, performing breathing and ROM exercise, skin care, avoidance and management of complications and side effects, and psychological self-care.

However most of them (97.3%) had unsatisfactory self-care regarding to avoidance of

infection. The majority (86.5%, 89.2%) had unsatisfactory self-care regarding avoidance of bleeding and medication regimen respectively, 51.4% of them had unsatisfactory self-care regarding to sticking to follow-up,

81.1% of them had satisfactory self-care regarding to avoidance of infection, 64.9% had satisfactory self-care regarding to avoidance of bleeding, 62.2% had satisfactory self-care regarding to following the dietary regimen, 70.3% of them had satisfactory self-care regarding to medication regimen, 83.8% of them had satisfactory self-care

regarding to sticking to follow-up, while 67.6% had satisfactory self-care regarding to avoidance and management of complications and side effects.

The same table shows a statistically significant difference regarding to total self-care and self-care; avoidance of infection and bleeding, following the dietary regimen, performing breathing and ROM exercise, skin care, sexual activity, medication regimen, sticking to follow-up, avoidance and management of complications and side effects.

Table (5): Patients' self-care pre and post Educational program

Items	Pre (n=37)			Post (n=37)			T-test	P-value
	No.	%	Mean ± SD	No.	%	Mean ± SD		
Avoidance of infection:								
Satisfactory	1	2.7		30	81.1			
Unsatisfactory	36	97.3	28.9±6.57	7	18.9	45.0±6.35	16.36	.000*
Avoidance of bleeding:								
Satisfactory	5	13.5		24	64.9			
Unsatisfactory	32	86.5	26.5±5.86	13	35.1	35.8±4.01	11.76	.000*
Follow the dietary regimen:								
Satisfactory	0	0.0		23	62.2			
Unsatisfactory	37	100	29.7±5.63	14	37.8	49.5±6.68	13.85	.000*
Perform breathing & ROM Exercise:								
Satisfactory	0	0.0		0	0.0			
Unsatisfactory	37	100.0	10.0±0.0	37	100.0	24.3±7.02	12.41	.000*
Skin care:								
Satisfactory	0	0.0		3	8.1			
Unsatisfactory	37	100.0	27.5±5.49	34	91.9	43.7±4.44	14.09	.000*
sexual activity (n=23):								
Satisfactory	1	4.3		8	34.8			
Unsatisfactory	22	95.7	11.4±2.73	15	65.2	17.5±3.04	6.68	.000*
Medication regimen:								
Satisfactory	4	10.8		26	70.3			
Unsatisfactory	33	89.2	19.6±4.33	11	29.7	26.7±3.42	8.72	.000*
Stick follow-up plan:								
Satisfactory	18	48.6		31	83.8			
Unsatisfactory	19	51.4	7.4±2.41	6	16.2	8.7±1.36	3.63	.001*
Avoidance & management of complications & side effects:								
Satisfactory	0	0.0		25	67.6			
Unsatisfactory	37	100.0	191.0±20.50	12	32.4	276.0±27.32	14.29	.000*
Total self-care:								
Satisfactory	0	0.0		20	54.1			
Unsatisfactory	37	100.0	425.8±53.27	17	45.9	621.9±62.50	16.61	.000*

* Significant

Table (6): Relations between patients' levels of knowledge and their socio-demographic characteristics.

Items	Level of Knowledge (n= 37)				X ²	P-value
	Unsatisfactory (n=9)		Satisfactory (n=28)			
	No.	%	No.	%		
Age (In years):						
<25-	3	33.3	18	64.2	3.2	NS
35-	2	22.3	5	17.9		
45+	4	44.4	5	17.9		
Gender:					0	NS
Male	4	44.4	13	46.4		
Female	5	55.6	15	53.6		
Marital status:					0.2	NS
Married	5	55.6	18	64.3		
Unmarried	4	44.4	10	35.7		
Education:					22.1	**
Uneducated	7	77.7	1	3.6		
Educated	2	22.3	27	96.4		
Socio-economic level:					7.5	*
Low	7	77.7	8	28.6		
Middle	2	22.3	11	39.3		
High	0	0.0	9	32.1		
Job:					5.0	NS
Professional	4	44.4	9	32.1		
Others	5	55.6	19	67.9		
House condition:					2.2	NS
Poor	5	55.6	8	28.6		
Average	4	44.4	20	71.4		
Residency:					10.1	**
Town	1	11.1	20	71.4		
Village	8	88.9	8	28.6		

Table (6) reveals that, there were statistically significant differences between patients' levels of knowledge and their socio-demographic

characteristics regarding to education, socio-economic level and residency.

Table (7): Relations between patients' skill performance and their socio-demographic characteristics.

Items	Essential Skill Performance (n= 37)				X ²	P-value
	Inadequate performance (n=12)		Adequate performance (n=25)			
	No.	%	No.	%		
Age (In years):						
<25-	3	25.0	18	72.0	8.6	*
35-	5	41.7	2	8.0		
45+	4	33.3	5	20.0		
Gender:					1.0	NS
Male	6	50.0	11	44.0		
Female	6	50.0	14	56.0		
Marital status:					0.2	NS
Married	8	66.7	15	60.0		
Unmarried	4	33.3	10	40.0		
Education:					21.3	**
Uneducated	8	66.7	0	0.0		
Educated	4	33.3	25	100.0		
Socio-economic level:					14.1	**
Low	10	83.3	5	20.0		
Middle	2	16.7	11	44.0		
High	0	0.0	9	36.0		
Job:					1.7	NS
Professional	6	50.0	7	28.0		
Others	6	50.0	18	72.0		
House condition:					3.0	NS
Poor	5	41.7	8	32.0		

Average	7	58.3	17	68.0		
Residency:						
Town	2	16.7	19	76.0		
Village	10	83.3	6	24.0	11.6	**

Table (7): indicates that, there were statistically significant differences between patient's skill performance and their socio-demographic

characteristics regarding to age, education, socio-economic level and residency.

Table(8): Relations between patients' self-care and their socio-demographic.

Items	Self-care (n= 37)				X ²	P-value
	Unsatisfactory (n=17)		Satisfactory (n=20)			
	No.	%	No.	%		
Age (In years):						
<25-	8	47.0	13	65.0	2.4	NS
35-	5	29.5	2	10.0		
45+	4	23.5	5	25.0		
Gender:						
Male	9	52.9	8	40.0	6.0	NS
Female	8	47.1	12	60.0		
Marital status:						
Married	9	52.9	14	70.0	1.1	NS
Unmarried	8	47.1	6	30.0		
Education:						
Uneducated	8	47.1	0	0.0	12.0	**
Educated	9	52.9	20	100.0		
Socio-economic level:						
Low	12	70.6	3	15.0	12.6	**
Middle	4	23.5	9	45.0		
High	1	5.9	8	40.0		
Job:						
Professional	7	41.2	6	30.0	5.0	NS
Others	10	58.8	14	70.0		
House condition:						
Poor	7	41.2	6	30.0	5.0	NS
Average	10	58.8	14	70.0		
Residency:						
Town	5	29.4	16	80.0	9.6	**
Village	12	70.6	4	20.0		

Table (8) reveals that, there were statistically significant differences between patients' self-care and their socio-demographic characteristics regarding to education, socio-economic level and residency.

4. Discussion

Findings of this study revealed that female patients represent slightly more than half of the sample. This finding is not corresponding with *Hadi, Moezzi and Aminlari (2008)*, who mentioned that, leukemia are higher among males than among females. This might be due to that most of patients who knew their diagnosis and agreed to participate in the study were females.

In relation to socio-economic standard of the patients, the results of the present study revealed that for the majority of them, treatment fees were paid by government and slightly more than two fifths of them

had low socio-economic level as their per capita monthly income is relatively low. In addition, less than two thirds of patients live in poor environmental conditions. This might be due to the fact that, the study was carried out in a public hospital, where usually a relatively high percentage of the patients are of low socio-economic classes.

In the present study, more than three fifths of patients were exposed to passive smoking. This finding was in accordance with *Khaled, Patrick, Belkacem, Johnson and Kenneth (2005)*, who stated that, regular long-term environmental tobacco smoke exposure may be a risk factor for certain, forms of adult leukemia.

Regarding to family history of neoplasm, less than one tenth of patients had neoplasm history in family and half of these had leukemia. This finding is not corresponding with *Hadi, Moezzi and Aminlari*

(2008), who stated that, a positive family history of leukemia among 1st degree relatives has been associated with increased risk for ALL.

One of the noticeable finding in this study is that approximately three quarters of patients had leukemia for less than six months. This might be attributed to the increase in mortality rate among patients with leukemia. This finding is not corresponding with *Stonehill (2006)*, who reported that Survival rates improved significantly for patients with leukemia.

As regards patients' knowledge assessment, the present study findings revealed that there was a statistically significant difference in patients' knowledge between pre/post programs. The present study result also indicated that three quarters of patients had satisfactory knowledge after program. This difference in knowledge found in the present study might be related to the knowledge acquired from the educational program. This is similar to *Abd El-Latif (2004)*, who stated that, patients with osteoporosis who received counseling program had improvement of their knowledge after implementation of the counseling program. This finding was parallel with *Subongkot, Srisawat, Johns and Sookprasert (2009)*, who reported that, patients who received educational program had continuous improvement of knowledge.

In relation to performance, the present study result documented that, there was a statistically significant difference among the study group pre/post program. Approximately three quarters of patients had adequate performance regarding to oral care, measurement of body temperature, deep breathing exercise and range of motion. These findings are similar to that of *El-Araby (2002)*, who found that, the skills of mothers of leukemic children were improved after implementation of the program.

In relation to self-care, there were statistically significant differences among the study group regarding to avoidance of infection and bleeding after implementation of the educational program. The results of the present study might be related to the knowledge and skills acquired from the program application. This was supported by *Mersal (2006)*, who mentioned that measures for avoidance of infection and bleeding were improved after implementation of the educational program for patients after bone marrow transplantation.

Also result showed a statistically significant difference among the study group through the two phases of assessment which related to following the dietary regimen, which might be attributed to the program implementation. This finding was in accordance with *El-Said (2008)*, who reported that, diet for patients with cancer was improved after implementation of the program.

In relation to breathing and ROM exercise the current study result indicated that, there was a statistically significant difference among the study group post implementation of the program and none of the patients had satisfactory level through the two phases of assessment. This might be due to that pre educational program patients had never practiced exercise, although after implementation of the educational program, patients performed exercise sometimes and seldom, so they were not able to reach a satisfactory level. This result might be due to that patients' perception that, they are able to move out of the bed and change position frequently they felt no need to practice exercise regularly. This finding is in agreement with *El-Sayed (2006)*, who found that, all patients with leukemia in the study hadn't performed regular exercise.

Concerning avoidance and management of complications and side effects, this study finding showed that, there was a statistically significant difference among the study group pre/post program. This result might be related to the knowledge and skills acquired from educational program those encouraged patients to apply them since they relieved from pain and gave them chance to feel better.

The present study findings reported that, there was a statistically significant difference among the study group pre/post educational program implementation regarding to self-care. This finding might be related to the knowledge and skills patients acquired from the educational program.

Regarding to gender, more than half of patients had satisfactory level of knowledge and adequate performance were females. This finding is incongruent with that of *Belal (2004)*, who mentioned that, males are usually over concerned about their health than females. From the researcher opinion this might be due to that the female having multiple duties, she feels that she is very important in family especially if she is married and has children so she is more concerned about her health.

The present study revealed that most of patients who have satisfactory level of knowledge and all of them having adequate performance were educated. This might be due to the perception of educated patients about the importance of correct knowledge and adequate performance to obtain the maximum benefits from the treatment. This finding was supported by *Ahmed (2000)*, who stated that, patients with high level of education are usually better in their knowledge, behavior, and beliefs toward health and can manage their health problems more correctly than non educated ones.

The present study revealed that, the majority of patients who had unsatisfactory level of knowledge and inadequate performance were from

villages. This might be due to that most of patients residing villages were illiterate. This finding was on line with *Ahmed (2003)*, who found that, the patients from village areas have lower socio-economic class and are mostly illiterate.

The relation between patients' self-care and their socio-demographic characteristics in the present study, all patients who had satisfactory self-care were educated. This might be due to that educated patients had satisfactory knowledge and adequate performance. This was parallel with *Ahmed (2000)*, who stated that, patients with high level of education are usually better in their knowledge. Similarly, *El-Sayed (2006)* mentioned that educated patients with leukemia had satisfactory self-care than non-educated ones.

The present study result revealed that less than three quarters of patients who had unsatisfactory self-care were the low socio-economic level. This might be due to that this category of patients can not eat healthy diet during their treatment period as well as following the appropriate ways to avoid infection and bleeding as using soft-bristle and electric razor. Moreover, maintaining regular follow-up could be interrupted because the expensive of the travel fees in addition to that they have to repeatedly leave their work which reflect negatively on their income.

In this study findings indicated that there was a statistically significant positive correlation between level of knowledge and skill performance before program implementation. This finding clarified that when patients' level of knowledge improves their performance improves as well.

The present study revealed that there were statistically significant positive correlations between level of knowledge, and skill performance and self-care after program implementation. This finding clarified that when patients' level of knowledge and performance improved, their self-care also improved. *Parissopoulou and Kotzabassaki (2004)* reported that self-care is achieved when individuals are transformed from passive, dependent patients to active partners.

To summarize, results of this study support the research hypothesis that counseling will affect positively on self-care for patients with leukemia. This is in agreement with *Subongkot, Srisawat, Johns and Sookprasert (2009)*, who found that patients who received educational had continuous improvement of knowledge and satisfaction that could lead patient to cooperate in self-care for reducing the adverse events of their disease.

Conclusion

The present study concluded that:

Improvement was obvious in the level of knowledge, performance of skills and self-care of patients under study after attending the educational program. So the present study findings support the hypothesis that educational will affect positively on self-care for patients with leukemia.

Recommendations

Educational program should be available in a form of illustrated booklet in Institute of Oncology as a reference for patients with leukemia. Where the nurses act as an advocate to ensure that this information is provided.

Health teaching of patients with leukemia in the Hematology Unit and continued reinforcement at their follow-up visits to clinics should be performed for enhancing their compliance toward the therapeutic regimen. This could be done by collaboration between nurses and doctors through a rehabilitation program

Families of patients with leukemia should be involved in the care of their patients.

Replication of the current study on a larger probability sample is recommended to achieve generalizability and wider utilization of the designed counseling program.

Corresponding author

Jehan S. Ali Sayyed

Adult Care Nursing Department, Faculty of Nursing
El - Minia University
jeahan_sayyed@yahoo.com

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