Effectiveness of Nursing Care Standard Regarding the Infection Control Precaution of leukemic Children

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Abstract:
Infectious complications continue to be one of the major causes of morbidity and mortality in patients with leukemia. **Aim of** this study was to establish basic standards of infection control of leukemia to the nurses working in Hematology and Oncology Unit.Materials and method. The present study consisted of 30 nurses working in Hematology and Oncology Unit and responsible for providing direct care for leukemic children. **Three tools** were used to collect data:. Knowledge assessment sheet and observation checklist to assess nurses' knowledge and actual performance of nurses providing direct care for leukemia in Hematology and Oncology e Unit before, immediately, and after three months from the standard application .**Results**. Shows that, before the standard application the total scores of knowledge for nurses were good (30 %) and poor with percentages of (70%). It was improved immediate, and after three months later of the standard application. There was significant difference in nurses' performance before immediate, and after three months of the standard application. Conclusion: it can be concluded that all the nursing activities presented in the initial standard as basic nursing responsibilities was enhanced. **Recommendations**: the developed standards should be translated into Arabic and disseminated to the managers of health organizations.

Introduction

Leukemia is a type of cancer that affects the blood and bone marrow, the spongy center of bones, where the blood cells are formed. The disease develops when blood cells produced in the bone marrow grow out of control. Leukemia is the most common cancer in children and teens. An estimated 48,610 new cases of leukemia are expected to be diagnosed in the United States in 2013. Accounting for almost 1 out of 3 cancers overall.[1'2]

Infections remain a major cause of morbidity and mortality in patients with leukemia. The pathogenesis of these complications is related to immune defects inherent to the primary disease as well as to therapy-relate immunosuppressant. The spectrum of infections seen has evolved with the therapeutic use of chemotherapy, which induce specific cellular immune defects[3]Although bacterial infections are most common, fungal and herpes virus infections are also seen with use of these agents. This overview will summarize the pathogenesis of infection in patients with leukemia as well as the spectrum of infection and approaches to the prophylactic and therapeutic management of these complications.

The prevention of infection is an important outcome to measure in patients with cancer because infectious complications are a significant cause of morbidity and mortality. Nurses play a vital role in the prevention of infection in patients with cancer through nursing practice, research, and patient education. However, many common nursing interventions to prevent infection are based on tradition or expert opinion and have not been subjected to prevent infections in patients with cancer. [4]

Standard Precautions represent the minimum infection prevention measures that apply to all patient care, regardless of suspected or confirmed infection status of the patient, in any setting where healthcare is delivered. These evidence-based practices are designed to both protect healthcare personal and prevent the spared of infection among patient. Standard Precautions replaces earlier guidance relating to Universal Precautions and Body Substance Isolation. Standard Precautions include: 1) hand hygiene, 2) use of personal protective equipment, 3) respiratory hygiene and cough etiquette, 4) safe injection practices, and 5) safe handling of potentially contaminated equipment or surfaces in the patient environment.[5'6]

Standards are explicit statement of expected quality in the performance of a care activity. Standards communicate expectation for how a particular health care activity will be

performed in order to achieve the desired results and define, for both health workers and clients as what needed to produce quality services. Standards are prerequisites for the promotion of save, competent and ethical nursing practice. Nursing practice standards have been developed to guide and direct nursing practice, promote professional nursing practice, facilitate evaluation of nursing practice, enable the patient to judge the adequacy of nursing care, and provide a framework for developing specialty nursing standards and facilitate articulation of the role of nursing within the health team .[7]

Aim of the study

- Determine nurse's knowledge and performance regarding infection control measures in caring of leukemic children before, immediate and after three months later from the standard application.
- Establish basic standers regarding the infection control precaution of leukemic children.

Materials and Method.

Research design: - A quasi-experimental research design was used to accomplish this study.

Setting: The study was conducted at the Hematology Oncology units of Tanta University Hospital

Sample: Consisted of two groups: the first group compromised 15 experts in the field of hematology, and the second group compromised 30 nurses working in Hematology and Oncology Unit, and they responsible for providing direct care for leukemic child.

Tools: - Three tools were used to collect the study data: **Structured interview sheet** which used to elicit the opinions of experts regarding the competencies of infection control strategies required from nurses during the provision of nursing care for children with leukemia. **Knowledge assessment sheet and Observational checklist:** used to assess nurses' knowledge and actual performance of nurses regarding using standard infection control precaution during direct care of children with leukemia before , immediately, and after three months from the standard application. **Resource checklist:** to assess the availability of resources in Hematology and oncology unit.

Method:-All nurses were observed during different nursing procedure at different shifts (morning, afternoon and night shifts).

- The questionnaire was answered on an individual basis in the presence of the researcher. The time needed to answer the questionnaire ranged from thirty minutes to one hour.

- Data collection of this tool lasted approximately one years.
- Preparation of suitable media for teaching the nurses including; lectures, data show, poster, video, doll for redemonstration, and book notes.
- Determining the framework of the standards; The Donnabedian model (structure, process and
- Outcome) was used.
- Implementation of the standard care strategies.
- Nurses were divided into fife groups, sex nurses in each group.
- The standard of care was discussed for all nurses included in the study; it includes
- -Evaluation was done immediately and three months later. Part (1):-Knowledge of the nurses regarding infection control measures was evaluated and classified as:
- Every item was evaluated as follow:
- Correct and complete answer was scored (2)
- Correct and incomplete answer had been scored (1)
- incorrect and incomplete answer had been scored (0)
- Total score of knowledge items was calculated in percentage and a score of 70% or more is considered good, 60-69% fair & less than 60% was considered poor.

Part (2): Practice of the nurses regarding infection control measures was evaluated and classified as:

-Every item evaluated as follow:

•Competent (Correct and complete done) had been scored (2)

•Incompetent (Correct and incomplete done) had been scored (0)

-Incorrect or not done had been scored (0)

-The scoring system of the practice including zero point for either incorrectly or not done, because this result will affect the survival of the infection control of leukemia

-The total score of every item had been calculated in percentage and classified as follow:

•70%and more had been considered good

•70-69 % had been considered fair.

•Less than 60% had been considered poor.

Results: Table (1) illustrates distribution percentage of nurses' competence level of knowledge about infection control precaution of leukemia before, immediate and after three months of the standard. Regarding the nurse's knowledge about the disease, it was observed that there was 79.67 % of the answer was competent whereas only 23.33 % was not competent before application of the standard. While, the answers were competent immediate and three months after the standard application.

Regarding to nurses 'knowledge about infection control measures, it was showed that 70% of nurses answer was not competent while only 30% of them was competent before the standard application. On other hand, all nurses answers were competent immediate and three months after the standard application. **Table (2)** illustrates percentage distribution of Nurses' Level of practice about infection control precaution in leukemic patient. None of the nurses was competent in hand washing practice before the standard application of the standard. On contrary, immediate and after three months 100% of them were competent hand washing technique.

As regarding wearing and removing protective measures, clinging, disinfection and stylization, managing significant exposure to blood or any secretion, , handling laboratory specimen, medication a administration, all nurses practice were not competent before the standard application whereas all nurses' practice immediate a three months later was competent

In addition 70%, 63%, and 63% and 60% of nurses were competent in Handling contaminated waste, Handling of sharps, intravenous catheter care practice and Opening sterile package respectively before, immediate and after three months of the standard

Table (3) and figures (1) presents the total score for the nurses' knowledge and practice .Before the standard application, the total scores of knowledge for nurses were fair and poor with percentage 26.67% and 70.00 % respectively. Whereas, immediate, and after three months of the standard, the total score of knowledge for all nurses performance (100%) was good .As regarding the total practice score 100% of nurses' performance was poor before the standard respectively. While immediately after standard application the standard all nurses' performance (100%) was good.

Figure (2) shows correlation between knowledge and practice: It was revealed that there was significant correlation between knowledge and practice of the nurses, where r=0.570 and P-value=0.013*

Table (4) shows positive correlation between the nurses knowledge and educational level and years of experience where. On other hand there was negative correlation between the knowledge and age and training program.

Regarding to the nurses practice, it was showed that a positive correlation between the nurses practice and educational level and years of experience where. On other hand there was negative correlation between the knowledge and age and training program

Table (5) shows distribution of nurses according to their response towards obstacle

that prevent them from application of infection control measures. And blood –born infection .In relation views about factors affecting practice of universal infection control precaution in hematology unit .Factors that were ranked first and received (76.67%) degree of importance by the nurses were related to unavailability of recourses and facilities. Followed by (10. %) of the sample reported that was difficult to work with it. Whereas the rest of sample mention that it was time consuming .and nurses not interesting with application of infection control precaution.

Regarding to their response towards blood born infections, In relation to positive response, none of the nurses neither assume every patient as being potentially infectious nor Perform investigation continuously for reassurance. While 50.03% of the sample reported Take immunization vaccine followed by and (10. %) of them mentioned fear of blood. Concerning negative response, 23.33% of the sample doesn't perform investigation because they are expensive. Followed by 6.67% of the sample reported that don't perform investigation for fear of discovering being infected. The rest of the sample respond don't like working in unit, nothing to be done as work becomes habit and leave it for God with percentage (3.33%) reported difficult to work with it. While rest of them responds

Table (1): Distribution percentage of Nurses' knowledge about infection control precaution of leukemia before, immediate and after three months of the standard.

		Pre			Post	After three months.		Chi-square	
		Not competent	Competent	Not competent	Competent	Not competent	Competent	X^2	P-value
Knowledge about the disease	N	7	23	0	30	0	30	15.181	0.001
	%	23.33	76.67	0.00	100.00	0.00	100.00		
Knowledge about the infection control precaution.	N	21	9	0	30	0	30	54.783	0.000
	%	70.00	30.00	0.00	100.00	0.00	100.00		
Total	N	21	9	0	30	0	30	54.783	0.000
	%	70.00	30.00	0.00	100.00	0.00	100.00		

Table (2): Percentage Distribution of Nurses' Practice Level About Infection Control Precaution of leukemia Before, Immediate and After Three Months of the Stander.

		Pre		Post		Follow up		Chi-square	
		Not competent	Competent	Not competent	Competent	Not competent	Competent	X^2	P-value
Hand washing.	N	(n= 21)	(n= 9)	(n=0)	(n=30)	(n=0)	(n=30)	54.783	0.000
	%	70.00	30.00	0.00	100.00	0.00	100.00		
Wearing and removing protective measures.	N	25	5	0	30	0	30	69.231	0.000
	%	83.33	16.67	0.00	100.00	0.00	100.00		
Clinging, disinfection and stylization.	N	25	5	30	0	0	30	72.468	0.000
	%	83.33	16.67	100.00	0.00	0.00	100.00		
Handling contaminated waste	N	9	21	0	30	0	30	20.000	0.000
	%	30.00	70.00	0.00	100.00	0.00	100.00		
Managing significant exposure to blood or any secretion.	N	13	17	0	30	0	30	30.390	0.000
	%	43.33	56.67	0.00	100.00	0.00	100.00		
Handling of sharps.	N	11	19	0	30	0	30	25.063	0.000
	%	36.67	63.33	0.00	100.00	0.00	100.00		
Handling	N	29	1	0	30	0	30	85.574	0.000

laboratory specimen.	%	96.67	3.33	0.00	100.00	0.00	100.00		
Intravenous catheter care practice	N	11	19	0	30	0	30	25.063	0.000
	%	36.67	63.33	0.00	100.00	0.00	100.00		
Opening sterile package	N	12	18	0	30	0	30	27.692	0.000
	%	40.00	60.00	0.00	100.00	0.00	100.00		
Medication Administration.	N	29	1	0	30	0	30	85.574	0.000
	%	96.67	3.33	0.00	100.00	0.00	100.00		
Total practice.	N	30	0	0	30	0	30	90.000	0.000
	%	100.00	0.00	0.00	100.00	0.00	100.00		

Table (3): The Total Score for the nurses' knowledge and practice.

Items		Pre		Post		Follow up		Chi-square	
		N	%	N	%	N	%	X^2	P-value
Practices	Poor	30	100.00	0	0.00	0	0.00	114.573	0.000
	Fair	0	0.00	0	0.00	0	0.00		
	Good	0	0.00	30	100.00	30	100.00		
Knowledge	Poor	21	70.00	0	0.00	0	0.00	104.367	0.000
	Fair	8	26.67	0	0.00	0	0.00		
	Good	1	3.33	30	100.00	30	100.00		

Figure (1): The Total Score for the Nurses' knowledge and practice.

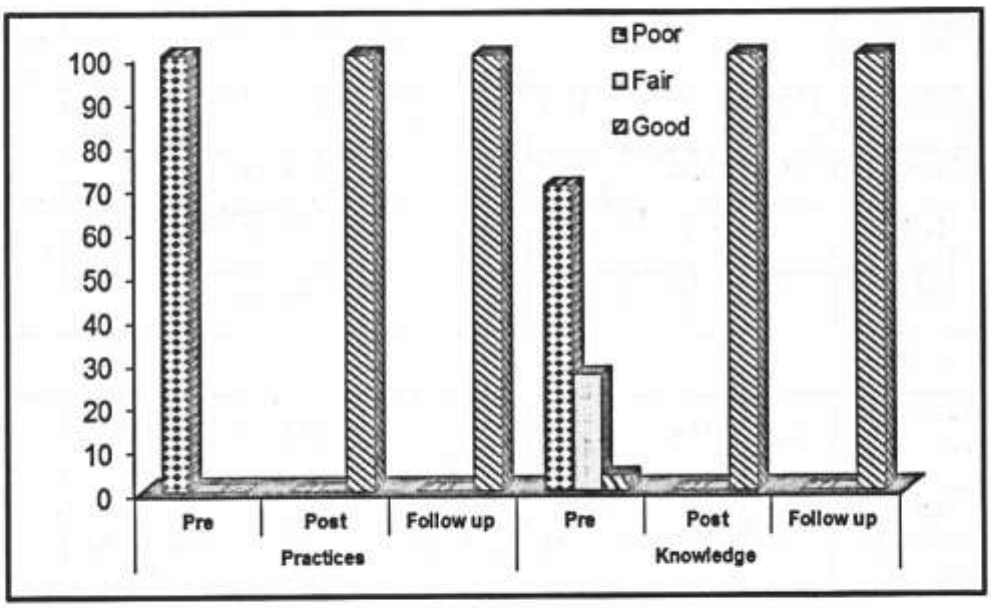

Figure (2): Relation between Nurses Knowledge and Practice.

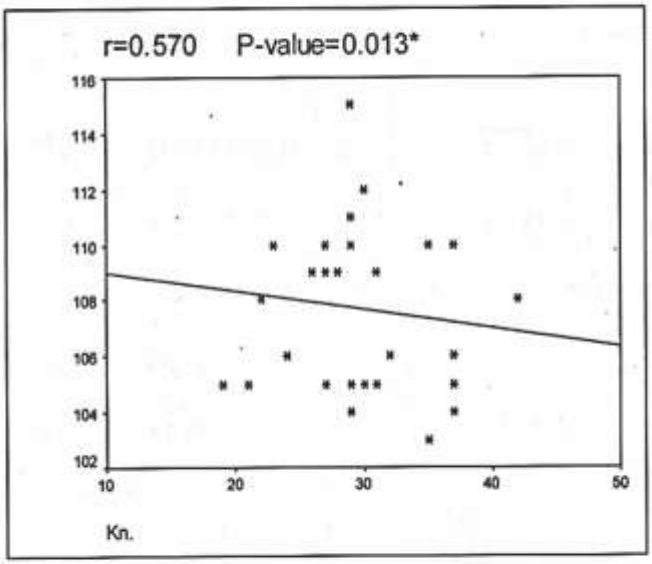

Table (1): Percentage distribution of school age children according to their fear before and after progressive muscle relaxation technique.

Items of fear	Before progressive muscle relaxation technique.			After progressive muscle relaxation technique.				
	Not afraid/ Afraid a little	Afraid	Very afraid/ terrified	Not afraid/ Afraid a little	afraid	Very afraid /terrified	Z	P
Seeing the dentist	79	16	5	92	6	2	3.567	0.001*
Dentist ask to open the mouth	77	16	7	88	10	2	3.557	0.001*
Doctor examine the mouth	74	18	8	86	12	2	4.025	0.001*
Dentist put instruments in the mouth	49	30	21	81	13	6	6.179	0.001*
Nurse or the dentist clean the teeth	55	33	12	78	18	4	5.240	0.001*
seeing the injections (shots)	12	36	52	48	38	14	7.339	0.001*
seeing dentist drilling	20	33	47	57	30	13	7.081	0.001*
hearing the noise of the dentist drilling	16	34	50	56	29	15	7.59	0.001*
Feeling with the movement of dentist drilling inside the mouth	9	29	62	47	34	19	7.488	0.001*

Chocking	70	13	17	83	14	3	4.396	0.001*
Having to go top hospital	88	12	0	94	6	0	2.121	0.034*
seeing people in white uniform	94	6	0	96	4	0	1.4141	0.157
seeing doctors	94	5	1	96	4	0	1.134	0.257
Having somebody look at you	94	6	0	97	3	0	1.732	0.083
Having a stranger touch you	93	7	0	97	3	0	2.000	0.046*

Table (2): Total score of fear and anxiety before and after the Progressive muscle relaxation technique for school age children.

Variables	Before progressive muscle relaxation technique.		After		Z	P
	No	%	No	%		
Fear					4.796	0.001*
Absent (15 -37 score)	68	68.0	91	91.0		
Present 38 or more	32	32.0	9	9.0		
Anxiety					4.264	0.001*
Mild (0- 12 score)	59	59.0	77	77.0		
Moderate (13-24 score)	39	39.0	23	23.0		
Severe (25- 36 score)	2	2.0	0	0.0		

Significant at 5% level

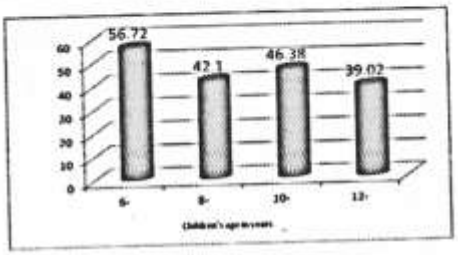

Figure (1): Fear total mean score of school age children and age in

Table (3): Relation of anxiety total mean score and demographic characteristics of school age children.

demographic	Anxiety total percentage score		F	P
	Mean	SD		
Gender:			0.817	0.416
Boys	29.35	18.57		
Girls	32.33	17.73		
Age in years:			6.990	0.001*
6-	18.16	10.61		
8-	33.97	18.41		
10-	36.86	18.41		
12-	19.07	13.52		
Birth order:			0.051	0.950
1	30.56	17.34		
2	31.51	18.52		
3+	30.11	19.15		
Education:			3.581	0.009*
1st&2nd grade	19.71	12.63		
3rd grade	37.25	20.62		
4th grade	35.61	13.79		
5th grade	34.22	17.91		
6th grade	27.31	21.18		

Significant at 5% level of significance.

Discussion

For many children, a visit to the dentist's office is a stressful event that can elicit feelings of fear and anxiety. These emotions cause behavioral changes during dental management which can affect the quality of care [11].

Since children exhibit abroad range of physical, intellectual, emotional and social development and diversity of attitudes and temperaments it's important that pediatric dental team including the nurse have a wide range of behavior guidance, techniques to the needs of the individual child and be flexible in their implementation [12]. High level of dental fear among children may lead to decrease seeking dental care. The present study found that the most fear provoking stimuli were the movement of the dentist drilling inside the mouth, seeing the injection, hearing the noise of dentist drilling and seeing dentist drilling. This can be explained as this might be the most painful and invasive dental procedure but after performing the progressive muscle relaxation technique, the fear level of children has decreased. This result is in line with Taani (2002) [13] reported that sight, sound and sensation of drill were the most fearful electing stimuli .On the contrary, Chellappah et al. (1990) [14], Peretz and Efrat (2000) [15] stated that the most provoking stimuli was feeling and seeing the needle . Furthermore, Ghoname (2009) [16] concluded that feeling and seeing the needle, sensation and sound of the drill followed by putting instrument in the mouth were the most provoking stimuli and responsible for dental fear.

Progressive muscle relaxation technique has been used before to control over anxiety during hospitalization of school age children and has a positive effect. In this study the progressive muscle relaxation technique is typically accompanied by deep breathing exercises used in order to control over anxiety and fear during dental management for children and according to the finding of this study, there was a significant positive relation between before and after using the progressive muscle relaxation technique regarding fear and anxiety during dental management.

This study was supported by Sultanof and Zalaqutta (2000) [17] , emphasized that practicing the progressive muscle relaxation technique enables the individual to maintain the calm and peaceful feelings during and just after a relaxation exercise through out the day and better equipped to deal with life's stresses and challenges. Also, this result in congruent with Gfeller (2003) [18] and Abu Elwafa (2004) [19] who revealed the greatest value of relaxation techniques in reducing acute pain and anxiety in children.

The result of the present work revealed that there was significant relation between gender and the prevalence of dental fear, Girls are showed higher mean of dental fear than boys. This is interpreted by the fact that males may not verbalize their fears because cultural practice may influence the difference in perception of fear between males and females and insists on the man should not be afraid or be weak for any reason. This result was typical in most populations and confirmed the results of the most previous studies [14-16, 20-26].

In the current study, the association between the child' fear perception and his/ her age, indicated that fear tends to decrease as children get older which might be due to the process of behavior adaptation , intellectual maturation and development and increasing their understanding and response to progressive muscle relaxation technique. This result is similar to the finding of Klinberg et al. (1994) [26] and Ghoname (2009) [16] concluded that younger children express higher dental fear than the older one while this finding differs from the study conducted by Murry et al. (1989) [27] reported that fear prevalence is higher with an increasing age also, this finding contradict to Veerkamp et al. (2002) [28] found that fear does not differ in different age groups.

Concerning the level of education of children, the result showed that children in the 1st and 2nd grade of education have the highest mean of fear level as in general the age has an effect on the response of children to stressful situations. Younger children can not so easily cope with stressful situations as the older ones, probably because they are not mature enough to suppress their fears.

The present study revealed that although the mean score of anxiety level in girls was slightly greater than in boys, the association between anxiety and gender was not statistically significant. This may be attributed to similarity in their age, level of understanding and presence of both sexes in at same environment. This finding is agreed with Granell et al. (1984) [29] who found that the prevalence of school refusal due to anxiety was equal for boys and girls and disagreed with Brenstein et al. (1996) [30] who indicated that the various community surveys show that girls are more likely to experience anxiety symptoms than boys.

It was evident from the present study that the age of children as a variable seems to affect the level of anxiety. The mean anxiety score level of 6 years children and 12 years children is lower than children with age 8-10 years. This might be due to that the young children have low level of awareness and this might be their first dental experience. On the other hand, the older children have high level of awareness and increase their response to

progressive muscle relaxation technique. While the children with age 8-10 year have immature cognitive ability and may have previous traumatic dental experience and decrease their response to progressive muscle relaxation technique. This result in agreement with Smith (2000) [31] and Bernstein who stated that anxiety manifests slightly differently in different age groups. Contrarily, Mohammed (1999) [32] who found that studied sample between the ages of 10-12 years had sever anxiety on admission to hospital.

Conclusion:

Based upon the finding of the present study, it could be concluded that:

-Progressive muscle relaxation technique has a positive effect on anxiety and fear of school age children during dental management after it's application and this effect appeared in the increase of school age children cooperation during dental management.

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