

Nursing Management of Children with Hemophilia according to Basic Standards

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Abstract:

Hemophilia is an inherited bleeding disorder in which there is a deficiency of one of the factors necessary for coagulation of the blood. Nursing care for children with Hemophilia should be provided based on established standard of care .

This study **aimed** to identify the effect of established basic standards for nursing management of children with hemophilia. All nurses working in Pediatric Hematology and Oncology unit at Tanta university hospital were included in the study with total number of 25. Structured interview sheet was used to assess nurses' knowledge and observation checklist to assess their actual performance in providing direct care for those children before , immediately, and after three months from the standard application.

The results showed that , total scores of nurses' knowledge pre standard application were fair 68% and poor 32%. Where as, immediately and after three months of the standard application; the total score for all nurses' knowledge was good. As regards total practice score of nurses before the standard application; it was found that , 60%, were fair and 40% poor. After three months , the majority of them (80%) were good and 20% were poor in their performance with statistically significant difference (p=0.001)

In conclusion: there was a significant improvement in nurses' knowledge and performance after the standard application. The developed standards should be available in Pediatric Hematology units in order to improve the quality of pediatric nursing care.

Recommendations: developing a process improvement team for developing standards and criteria of practice on the basis of structure, process and outcome. A special system for awarding, accreditation and certification should be taken into consideration to motivate nurses' participation and enrollment into the training and education programs which are conducted in the work place.

Introduction:

Hemophilia is an inherited bleeding disorder in which there is a deficiency of one of the factors necessary for coagulation of the blood. Hemophilia is transmitted as an X-linked recessive disorder. Hemophilia is classified into three groups based on the deficient factors. The two most common forms are factor VIII deficiency (hemophilia A or classic hemophilia) and factor IX deficiency (hemophilia B or Christmas hemophilia). The less common form of factor deficiencies is hemophilia C which is caused by factor XI deficiency (1).

The effect of hemophilia is prolonged bleeding any where from or in the body. Hemophilia is suspected in a newborn with excessive bleeding from the umbilical cord and bleeding into the muscle which, resulting in a deep bruise after receiving a routine vitamin K shot. Hemorrhage can occur as a result of minor trauma such as minor circumcision, during loss of deciduous teeth, and a slight fall or

bruise.. Hemarthrosis is the hall mark of hemophilia. Hemarthrosis is a bleeding into the joint cavities, especially the knees, elbows, and ankles (2,3) . Treatment depends up on the type and severity of hemophilia. Replacement is the most important aspect of management. Replacement preparation of factors VII and XI are available in the form of cryoprecipitate made from fresh plasma(4,5).

Since hemophilia is a lifelong condition, requires expensive treatment, and can be life threatening, it significantly affects many aspects of family life. Nurses play an integral role in caring for patients with inherited bleeding disorders. The general principles of care for child with bleeding disorders include; prevention of bleeding, prevent crippling effects of bleeding into the joint. Home therapy should be used to manage only uncomplicated mild/moderate bleeding episodes ⁽⁶⁾ Standards are explicit statements of expected quality in the

performance of a health care activity. Standards communicate expectations 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 safe, 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 ^(7,8). The Canadian Association of Nurses in Hemophilia Care (CANHC), emphasized on the need to ensure a high standard of nursing practice, education and research. In order to achieve a standard of a quality nursing care for children affected by hemophilia and other bleeding disorders, we strive to enhance professionalism through education, partnerships, collegiality and mentorship⁽⁹⁾.

Hemophilia is a serious life long health problem. It is dangerous and complicated disorder facing the nurses in her clinical practice. The dealing with hemophiliac

child without enough knowledge and practice is very difficult for the nurses. Thus the nurse working with hemophiliac children must be knowledgeable and skillful in the care for those children. Therefore, this study was conducted to establish basic standards for nursing management of children with hemophila

Materials and Method:

Research design;

**quasi experimental design
was used in this study**

Setting :The study was carried out at the hematology and Oncology Unit of Tanta University Hospital, over a period of one year from October 2009 to October 2010.

Subject: All nurses working in the previously mentioned setting were included with the total number of 25.

Tools: 1- Hemophilia nursing management competencies Structured sheet: to assess nurses' knowledge and skills in relation to the care provided to hemophiliac child.

Scoring of nurses' knowledge

The questionnaire's items encompassed 24 main categories or competencies for nursing care of children with hemophilia, The total number of questions was 24. The total score was 122.

- Nurses knowledge was evaluated and classified as:

Every item was evaluated as follow:

Correct and complete answer (competent) was scored (1)

incorrect and incomplete answer (incompetent) had been scored (0)

2-Nursing Practices observation check list:

It was developed to assess the competency level of nurses' performance during the care provided to hemophiliac children. every nurse was observed during different nursing procedures. The checklist comprised of nine procedures. These were distributed as follows: General measurements (score 80), measuring vital signs (score 62), Administration of IV fluids (score 102), blood administration (score 34), taking blood sample (score 38), Administration of IV (score 28), bleeding control (score 28), infection control (score 28) and communication skills (score 35)

Scoring of nurse's performance.

The total scores for all procedures were 435. It was considered incompetent when the total score was less than 70 % and competent when it ranged from 70%

to 100%.Every item evaluated as follow:

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

Correct and incomplete done (incompetent) had been scored (1)

Incorrect or not done (incompetent) had been scored (0)

These tools. was used three times: Before, Immediately and three month after the implementation of the standards nursing care protocol.

Methods

An official permission was obtained from Pediatric Hematology and Oncology unit for carrying out the study through official letters from Faculty of nursing explaining the purpose of the study..

-Nurses consent to participate in the study had been obtained. Privacy and confidentiality of the data and results were considered.

- The basic competencies and its underlined activities regarding nursing care of children with hemophilia were developed by reviewing the related literature.

- The standards had been developed based on the scope of skills and knowledge

- required by nurses working in Hematology Unit.
- The researcher had been Specified hemophilia nurse's qualifications needed for practice.
 - The researcher had been Identified the level of standards in this study to ensure basic safe practice. Basic level had been used in this study, i.e. the minimal acceptable level of performance needed by hemophilia nurse to ensure safe care.
 - Framework of the standards had been determined as; the structure- process- outcome:
 - Structure:** the attribute of settings where care had been delivered
 - Process:** components detail plan of the appropriate nursing attentions or behaviors required to implement nursing care. It included the clinical skills necessary for initial and ongoing care and management of actual or potential care problems.
 - Outcomes** components identify the expected results of care.
 - Emphasize was placed on "process standard" since it identifies what is expected from every nurse and describes what the nurse does.
 - The researcher had been assessed nurses' competencies (knowledge and skills) regarding the management of hemophiliac children using comprehensive standard:
 - The comprehensive standard: is the statement written in broad general terms.
 - The supporting standards: delineates more completely the range and scope of activities referred to by the comprehensive standard statements.
 - Skills/activities: are utilized to delineate the specific actions needed in the practice setting to achieve the supporting standard.
 - Outcome components identify the expected results of care
 - The nurses had been divided into five groups. 5 nurses in each group
 - The standards care protocol had been presented to all nurses included in the study in 5 sessions. Each group attended the following sessions:
 - 1- The first session about hemophilia:
Definition, causes, sign and symptoms , nursing management in case of external bleeding, and the importance of safety measures to prevent and control bleeding.
 - 2- The second session:
It was focused on:-
Make the hospital environment safe for the child, Assessment of Signs &

Symptoms of bleeding, taking vital signs and position of the child.

3- The third session:

It was focused on prevention of injury, medication administration, how to control bleeding episodes and the importance of practicing light exercises.

4- The fourth session:

It was concentrated on: Prevent crippling effects of bleeding in the joint, pain management, outside home precautions and Infusion of blood products.

5- The fifth session:

It was focused on: Blood drawing technique, Vaccination of hemophiliac children, providing emotional support to the parents of the child and discharge plan and home care.

-Each session had been last for 30-45 minutes. The theoretical part had been given through the first 10-15 minutes while the demonstration by the researcher carried out in the remaining minutes. Redemonstration by nurses carried out at the end of each session.

-Evaluation had been done before, immediately and after three months from the standard application.

Analysis of data

The collected data was organized, tabulated and statistically analyzed using

SPSS software statistical computer package version 12. For quantitative variables, mean and standard deviation were calculated. The number and percent distribution were calculated. Fisher exact test (p) was used to compare observations before and after the standard application. Significance was adopted at $p < 0.05$ for interpretation of results of tests of significance.

RESULTS

Table (1) illustrates the general characteristics of studied nurses. It was found that 80% of the nurses were 30 to 40 years old, while 20% of them were in the age group of 41 to 50 years. Regarding their education, the majority of them (96.5%) had diploma and only one nurse had bachelor degree. All of them did not attend any conference. Regarding years of experience in the hematology unit, more than half of the nurses (52) had 21 to 30 years and about one-third (32%) had 11 to 20 years of experience while those who had 5 to 10 years constituted 16%.

Table (2) illustrates the distribution of Nurses' Level of knowledge about hemophilia before, immediate, and three months after the standard application. All nurses were competent in their knowledge about blood components either before or immediate and after three months after the

application of the standard. As regards blood clotting mechanism, only 26% of nurses were competent before the application of the standard, while the answers of 96.5%, and 92% of them were competent immediate, and three months later after the standard application. Moreover, 80% of them were competent regarding the definition of hemophilia compared with all of them (100%) immediate, and three months later. In addition, it was found that 44% of nurses answers were competent in relation to causes of hemophilia where as immediate and three months later all nurses were competent. The results also reveals that, 64, 66%, 63%, and 75% of nurses were competent in their answers about types of hemophilia, signs and symptoms, complications, and investigations before the application of the standard respectively, while all of them were competent in those competencies immediately and three months after the standard application. Furthermore, the answers of 67% of the studied sample about hemophilia treatment were competent before the standard in comparison with all and 96.6% of them immediately, and three months later. It was found that, 77%, 54,5, 70%, 76,6%, 80%, 70.6% of nurses were competent

before the standard application in their answers about aims of hemophilia treatment, nursing assessment to the child with hemophilia, hospital safety, vital signs measurements, child position, prevention of bleeding respectively. Where as, immediately and after three months of the standard application all nurses were competent in these questions. As regards control of bleeding and prevention of crippling effect in the joint, 67%, and 60% of nurses were competent before the standard while immediately they reached to all of them and after three months they were 95%, and 97% respectively. Before the standard 58%, 30%, 52%, 60%, 78%, 76.7%, and 69.7% of nurses were competent in pain management, dental care, care of bleeding from mouth, child diet, psychological care or the child and his family, and discharge planning respectively while immediately and after three months all of nurses were competent and the difference was statistically significant ($p=0.001$).

Table (3) illustrates the distribution of Nurses' Level of practice about hemophilia. It was found that, before the standard application none of them was competent in the general measurements. On the contrary, immediately and after three months 92, and 80% of them

respectively were competent in these measurements. As regards vital signs measurements, administration of IV fluids, administration of blood, and obtaining blood sample 40%, 60%, 32%, and 68% of nurses were competent in these competencies before the standard. Whereas, immediately and after three months all nurses were competent in these competencies.

In addition, 76%, 100 %, and 92% of nurses were competent in administration of medication through IV lines before, immediately, and after three months of the standard respectively. None of them were competent in control of bleeding before the standard while immediately and after three months all nurses were competent. Before the standard application 40% of nurses were competent in infection control compared to all of them immediately and 88% after three months. Moreover, 60%, 92 %, and 88% of nurses were competent in communication before, immediately, and after three months of the standard respectively. Regarding to total score of nurses knowledge, it was found that, before the standard, 60% of nurses were competent in their knowledge , while immediately, and after three months all nurses were competent and the difference was statistically significant (p=0.001).

Table (4) presents the Total Score for the Nurses' Knowledge and Practice. Before standard application the total scores of knowledge for nurses were fair and poor with percentage 68% and 32% respectively. Whereas, immediately and after three months of the standard the total score of knowledge for all nurses performance was good. As regards the total practice score, 60%, and 40% of nurses' performance was fair and poor before the standard respectively, while immediately after standard application all nurses' performance was good. After three months 80% and 20% of nurses' performance was good and poor respectively with a statistically significant difference (p=0.001)

Table (1): Distribution of the Nurses According to Their General Characteristics.

Characteristics.	(n=25)	
	No	%
Age (years)		
- 30-40	20	80
- 41-50	5	20
Mean ± SD	63.08 ± 12.8	
Educational level		
- bachelor degree	1	4
- diploma degree	24	96
-		
Attendance to any conference or workshop		
- yes	-	
- no	25	100
Years of experience in hematology unit		
- 5-10years	4	16
- 11-20 years	8	32
- 21-30 years	13	52
Mean ± SD	7.7 ± 6.6	
-		
total	25	100

Table (2): Nurses' Level of knowledge about hemophilia before, immediate, and three months after the standard application

Questions	Before standard				Immediately after the standard				Three months after the standard				Fisher exact test
	Competent answer		Incompetent answer		Competent answer		Incompetent answer		competent answer		incompetent answer		P value
	No*	%	No	%	No	%	No	%	No	%	No	%	
Blood components	100	100	-	-	100	100	-	-	100	100	-	-	0.001
Blood clotting mechanism	65	26	185	74	239	95.6	11	4.4	230	92	20	8	
Hemophilia definition	20	80	5	20	25	100	-	-	25	100	-	-	
Causes of hemophilia	22	44	28	56	50	100	-	-	50	100	-	-	
Types of hemophilia	48	64	27	36	75	100	-	-	75	100	-	-	
Signs and symptoms of hemophilia	132	66	68	34	200	100	-	-	200	100	-	-	
Complications of hemophilia	63	63	27	37	100	100	-	-	100	100	-	-	

Investigations of hemophilia	75	75	25	25	100	100	-	-	100	100	-	-	
Hemophilia treatment	100	67	50	33	150	100	-	-	145	96.6	5	3.4	
Aims of hemophilia treatment	58	77	17	23	75	100	-	-	75	100			
Nursing assessment to the child with hemophilia	180	54.5	95	45.5	275	100	-	-	275	100	-	-	
Hospital safety	70	70	30	30	100	100	-	-	100	100	-	-	

* The total score for each competency

Table(2) (Continued)

Questions	Before standard				Immediately after the standard				Three months after the standard				Fisher exact test P value
	Competent answer		Incompetent answer		Competent answer		Incompetent answer		competent answer		incompetent answer		0.001
	No*	%	No	%	No	%	No	%	No	%	No	%	
Vital signs measurements	59	78.6	16	21.4	75	100	-	-	75	100	-	-	
Child position	40	80	10	20	50	100	-	-	50	100	-	-	
Prevention of bleeding	212	70.6	88	29.4	300	100	-	-	300	100			
Control of bleeding	67	67	33	33	100	100	-	-	95	95	5	5	
Prevention of crippling effects in the joint	60	60	40	40	100	100	-	-	97	97	3	3	
Pain management	25	50	25	50	50	100	-	-	50	100	-	-	
Vaccination to the child with hemophilia	15	30	35	70	50	100	-	-	50	100	-	--	
Dental care	65	52	60	48	125	100	-	-	50	100	-	-	
Care to bleeding from mouth	90	60	60	40	150	100	-	--	150	100	-	-	
Child diet	117	78	33	22	150	100	-	-	150	100	-	-	
Psychological care to the child	115	76.7	35	23.3	150	100	-	-	150	100	-	-	
Discharge planning, and home care	209	69.7	91	30.3	300	100	-	-	290	96.6	10	3.4	

Table (3): Nurses' Level of practice about hemophilia care before, immediately, and after three months of the standard (n=25)

Competencies	Before standard				Immediately after the standard				Three months after the standard				Fisher exact test P value
	Competent		Incompetent		Competent		Incompetent		competent		incompetent		
	No	%	No	%	No	%	No	%	No	%	No	%	
General measurements	-	-	25	100	23	92	2	8	20	80	5	20	0.001
Vital signs measurements	10	40	15	60	25	100	-	-	25	100	-	-	
Administration of IV fluids	15	60	10	40	25	100	-	-	25	100	-	-	
Administration of blood	8	32	17	68	25	100	-	-	25	100	-	-	
Obtaining blood sample	17	68	8	32	25	100	-	-	25	100	-	-	
Medication administration through IV line	19	76	6	24	25	100	-	-	23	92	2	8	
Control of bleeding	-	-	25	100	25	100	-	-	20	80	5	20	
Infection control	5	20	20	80	25	100	-	-	22	88	3	12	
Communication	20	80	5	20	25	100	0.00	0.00	25	100	0.00	0.00	
Documentation	18	72	7	28	25	100			25	100			
Total score	15	60	10	40	25	100	-	-	25	100	-	-	

Table (4): Total Score for the Nurses' Knowledge and Practice

	Before standard		Immediately after the standard		Three months after the standard		Fisher exact test P value
	No	%	No	%	No	%	
Knowledge							0.001
Good	-	-	25	100	25	100	
Fair	17	68	-	-	-	-	
Poor	9	32	-	-	-	-	
Total	25	100	25	100	25	100	
Practice							
Good	-	-	25	100	20	80	0.001
Fair	15	60	-	-	5	20	
Poor	10	40	-	-	-	-	
Total	25	100	25	100	25	100	

Discussion

Nursing care of hemophilia is still an area in need of standardization. Many attempts have been made all over the world for developing standards in different areas⁽¹⁰⁻¹²⁾. For hemophilia there are many medical standards as Standards and criteria for the care of persons with congenital bleeding disorders (National Hemophilia Foundation 2002)⁽¹³⁾. Moreover, in Egypt many standards have been developed in many nursing specialties.⁽¹⁴⁻¹⁶⁾

The goal of nursing practice to the child with hemophilia in the hematology unit is to provide safe, competent and ethical nursing care. Nursing practice standards represent acceptable requirements for determining the quality of nursing care a patient/client receives. Nurses are committed to the development and implementation of practice standards through the ongoing acquisition, critical application and evaluation of relevant knowledge, attitudes, skills and judgments.^(17,18)

The current study figured out that, there was a significant improvement in nursing staff knowledge and performance after the standard application in relation to the care of hemophiliac children. This result is in accordance with a study conducted by **Suchitra and Lakshmi**⁽¹⁹⁾, who reported that education has a positive impact on retention of knowledge, attitude and practice in all

categories of staff. Also, **Mallik et al.**, added that, the educational programs always keep nurses familiar with recent advances in their area of specialty and maintain their speed and efficiency in carrying out their respective activities so the quality of care will be improved⁽²⁰⁾.

According to **Harmina and Mustafa** in a study done at Jordan University Hospital, they emphasized the importance of in-service education as a cornerstone of total quality management, and continuous improvement is impossible without it. It was effective in changing the nurses' knowledge⁽²¹⁾. The findings of the present study revealed that no in-service training program related to hemophilia was given to the nurses in the hematology and oncology unit. This result may be due to the absence of in-service training program department in the hospital and increased work load in the hematology and oncology unit.

In order to ascertain the provision of safe and competent care to the hemophiliacs, nurses should demonstrate competencies throughout their professional career. Competency is the ability to perform the task with desirable outcomes under the varied circumstances of the real world. Nurses'

competencies (knowledge and performance) in the Hematology and Oncology Unit must be appraised ⁽¹⁷⁻¹⁸⁾. It was found throughout the study that almost half of nurses' answers were incompetent in relation to their overall knowledge about hemophilia before the standard. This may be attributed to the absence of in-service-training programs and the related literature which help nurses get the required knowledge whenever they need. Furthermore, there was no motivation for the nurses to improve their performance. While, immediately and after three months of the standard application, all nurses were competent in their overall knowledge. This could be attributed to the fact that nurses are liable to learn and acquire knowledge through the standard application. In fact, the hemophilia topic was very interesting to nurses. This justification was in line with **Danasu** (2009) who stated that from the application to standards of care the nurses acquire knowledge that guides and improves their practice ⁽²²⁾.

Nursing care for the child with hemophilia is comprehensive and includes many competencies. Nursing care focuses on implementing measures to prevent or control bleeding and collaborating with child and family to reduce risk of complications associated with the disorder ⁽¹⁻⁵⁾. Before the standard application nearly

two- thirds of nurses have demonstrated incompetent level on the care for hemophiliac children . The low level of competencies reflects the poor working environment and the ambiguity of cut-responsibilities among nurses, as well as the absence of continuous in-service training programs. Whereas, immediately and after three months of the standard application all nurses had competent level of performance. The enhancement in performance may be related to the educational session and the frequent demonstration of related procedures during the period of the study. This could reflect the impact of education and training on nurses' performance improvement. The interpretation was in line with Potter (2005) who described that the nurse attains knowledge and competency through the standard application ⁽²³⁾.

It is important that nurses should acquire a level of knowledge which enables them to use standards efficiently. The present study revealed that the nurses' theoretical knowledge about blood clotting mechanism, causes of hemophilia, prevention of bleeding, and vaccination to

the child with hemophilia were incompetent before the standard application. On contrary, all nurses were competent in those aspects immediately and after three months of the standard application. The enhancement in nurses' knowledge could be attributed to the program content which was developed based on nurses' needs, its clarity and simplicity, using of audiovisual aids and the availability of teacher in the field for more clarification. This justification goes with Guilbert (1992) who mentioned that sequential organization means arranging the learning to begin with simpler concepts and skills and go on to broader and deeper concepts ⁽²⁴⁾. Also, this interpretation was supported by Camiah (1997) who emphasized that, nurses' educators should use more progressive method of teaching and learning and audiovisual material ⁽²⁵⁾.

Nursing assessment to the child with hemophilia is a curial role. The assessment centers on signs and symptoms that indicate bleeding, achievement of expected growth and development stages, and knowing the child and family's coping strategies ⁽²⁶⁾. Before the standard, nearly half of nurses

were incompetent in their knowledge concerning nursing assessment, prevention of crippling effects in the joint, and care to bleeding from mouth. This could be attributed to the fact that pediatricians usually perform most aspects in nursing assessment and there were no written duties for the nurses to carry out those aspects of care. While immediately and after three months of the standard application all nurses were competent in these aspects. The good change in nurses' knowledge may be arising from the standard application and continuous evaluation during the current study. This was in agreement with Dianne McMahon ⁽²⁷⁾(2009) who stated that the standard promotes, guides, directs professional nursing practice, and is important for self-assessment and evaluation of practicing nurses.

Hemarthrosis is bleeding into the joint cavities, especially the knees, elbows, and ankles. It causes severe pain with considerable loss of movement. The management of pain is best accomplished by using multimodal approach in which pharmacological and non-pharmacological measures complement each other. ^(28,29)

The findings of the present study showed that before the standard application nurses' knowledge about management of children' pain is lacking and inadequate as they were only concerned with the non-pharmacological management. In adequate nursing management of children' pain might be due to lack of basic educational programs concerned with knowledge and practices related to pain assessment and management, added to that the absence of training programs under highly experienced supervision. These findings were in agreement with the findings of **Abo El Waffa** (2004) who mentioned that lack of knowledge results in poor nursing management of pain ⁽³⁰⁾. The result was also in harmony with **Hegazy** (2005) who found that the nurses in pediatric surgical department at Tanta University Hospital have inadequate knowledge about pain management ⁽³¹⁾.

On the contrary, immediately and three months after the standard application all nurses were competent in their knowledge about pain management. This could be linked to increased nurse's knowledge about pain management after the educational sessions. The finding was

congruent with **Toomy** et. al. who cited that nursing performance improved after receiving the educational programs and they attributed this change to increased nurses' knowledge after the programs ⁽³²⁾.

Anthropometric measurements such as weight and height could help in assessing children's growth and development ⁽⁴⁻⁶⁾. As regards this aspect, the present study revealed that before the standard none of the studied nurses demonstrated competent level in performing anthropometric measurement . The finding is supported by **El-Mommani** ⁽³³⁾ (2002) who stated that the lowest scores were assigned to performing anthropometric measurements. Similarly, **Mahmoud** ⁽³⁴⁾ (2004) reported that approximately two-thirds of nurses were unsatisfactory in this aspect. Furthermore, **Mohamed** ⁽³⁵⁾ found that the majority of nurses didn't measure the length, the head and chest circumferences, while weighing was done by more than one-quarter of nurses. This could be attributed to the fact that pediatricians usually do the measurements on admission as a part of their physical examination, besides, the shortage in the nursing staff number in the hematology and oncology unit, and also

may it may be due to the absence of written order to measure the physical parameters.

On the opposite, immediately and three months later from the standard application the majority of the nurses were competent in performing anthropometric measurements. This finding could reflect the importance of training and supervision in enhancing nurses' performance. The result was in line with **Spouse** (2003) who explained that knowledge, complete instruction, and nurse's participation had a positive impact on practice ⁽³⁶⁾.

The importance of measuring vital signs cannot be ignored as it is a basic activity in the child' assessment which should precede nursing care implementation. It affects the physiological status of the children' bodies and provides critical information in order to evaluate the homeostatic balance and it gives indication for internal bleeding ^(2, 3). It was found from the present study that about two-thirds of nurses were incompetent in their performance regarding measuring vital signs before standard application. This reflects the unit policy as there is no sheet to record all vital signs item (except one sheet to record temperature only). While

there was significant importance to record blood pressure and pulse for hemophiliac children as any change in them could be an indicator for internal bleeding. The finding of the present study was in harmony with **Mahmoud** ⁽³⁴⁾2004) who found that approximately two-thirds of the studied nurses obtained unsatisfactory score regarding measuring vital signs.

Whereas, immediately and after three months from the standard application all nurses were competent in measuring vital signs. The enhancement after standard application may be related to the availability of the teacher in the unit for more clarification, using simple language, and continuous supervision and motivation in addition to the availability of vital signs sheet which includes all items. This could reflect the importance of adequate information and training. The interpretation was in line with **Gammon** and **Gould**, who showed that specific intervention strategies such as education are influential in improving knowledge and compliance ⁽³⁷⁾.

Fluids may be infused directly into the circulating blood volume to supplement or replace body fluids. The goal of fluid

therapy is to correct or prevent fluid and electrolyte imbalances, correct or prevent nutritional imbalances, or to provide IV medication. In assuming this responsibility, nurses are accountable to ensure the safety of the procedure and thus must be oriented to the possible complications and means of preventing their occurrence ⁽³⁸⁾. The current study showed that before the standard application nearly half of nurses obtained incompetent level of performance regarding intravenous fluids therapy. While, immediately and after three months from the standard all of them demonstrated competent level of performance in intravenous fluids therapy . Teaching to the nurses the correct amount of fluids and equipments needed, and how to initiate an infusion, regulate the fluid infusion rate, the early identification and correction of complications may be behind nurses' performance enhancement.

Since the 1980s the primary leading cause of death of children with severe hemophilia has shifted from [hemorrhage](#) to HIV/AIDS acquired through treatment with contaminated blood products. Blood transfusion is a critical procedure which needs competent nurses regarding the

knowledge and practice. The current research revealed that before the standard application slightly more than two- thirds of nurses were incompetent in their performance regarding blood transfusion. The finding could be attributed to the poor base of knowledge about blood transfusion procedure, and lack of continuous education in the unit. Whereas, immediately and three months later from the standard application all the nurses performance were competent. This may be related to the organized and effective in-service training and the availability of related procedures manuals. Besides, the nurses became more aware about the complications and the importance of blood transfusion for hemophiliac children. These interpretations were in line with **Abdullah** ⁽³⁹⁾ who mentioned that the person will do better if he knows more.

Obtaining blood sample from hemophiliac children is a skill in need for a highly competent nurse. The most important items in obtaining blood sample from hemophiliac children are avoiding arterial puncture and pressure after withdrawal for at least 10-15 minutes. The results of the current research showed that

slightly more than half of nurses were incompetent in this aspect before the standard application . The nurses were incompetent as they did not follow the principles of obtaining blood sample. On the contrary, immediately and three months from the standard application all nurses' performance was competent. This finding may be related to the training and supervision during the study period. This was in line with **Bluteronth** (1999) who reported that supervision is a dynamic, interpersonally focused experience which promotes the development of therapeutic efficiency. Consequently, continuous supervision must be considered as the cornerstone of clinical practice⁽⁴⁰⁾.

The earlier a bleeding episode is recognized, the more effectively it can be treated. If the child experiences bleeding episode, the nurse should control any bleeding by applying pressure to the area for at least 15 minutes, immobilize and elevate the affected area, and apply ice packs to promote vasoconstriction. Unfortunately, the present study revealed that all nurses were incompetent in control of bleeding before the standard application. This could be related to the lack of

knowledge as they used medication only to stop any bleeding. Moreover, this result may be attributed to the shortage in nurse numbers in the unit. On the contrary, immediately and after three months the majority of nurses were competent in controlling bleeding by applying pressure at the site of bleeding, elevating the affected part, and applying ice. These results are in agreement with **Essawy et. al.** (1997)⁽⁴¹⁾ who reported similar findings. This could be explained in the light of the eagerness of the nurses to become competent in their knowledge and practice. Further more, nurses had the liability to change by themselves but they need an instructor and a continuous evaluation. The point of view in agreement with **Elkin et al (2000)** who mentioned that evaluation promotes the development of therapeutic efficiency⁽⁴²⁾.

Infection constitutes a constant threat to the hemophiliac child. Of great importance in this respect is a knowledgeable and skillful hematology nurse of the simple measures for controlling infection. Moreover, the prevention of infection in health care setting remains a key goal for all health care personnel^(43, 44). The results

of studies carried out by **Attia**⁽⁴⁵⁾ (1992) and **El-Shenawy**⁽⁴⁶⁾ (2002) revealed that control of infection was considered a total responsibility of the nurse by the entire expert group included in the study. The present study showed that the majority of nurses had incompetent level of knowledge about infection control before the standard application. The absence of written policies and procedures for prevention and control of infection, the lack of resources, the absence of in-service training programs and a special system to motivate nurses' participation, are all reasons for this incompetent level of performance. The result of the present study was in disagreement with **El-Shenawy**⁽⁴⁶⁾ (2002) who found that knowledge of nurses was very good regarding the basic measures for infection control. On the other hand, **Ahmed**⁽⁴⁷⁾ (1996) stated that, nurses' knowledge and performance about infection control was satisfactory.

Immediately and three months later, the majority of nurses were competent in applying measures of infection control according to the available resources. The nurses became competent in infection control after application of the standard

because they applied the guidelines in practice and they had known the importance of infection control for hemophiliac children. Furthermore, they realize the risk of improper application to infection control measures for the patients and for themselves. The result was congruent with **El-Azzazy** (2007) who reported that there was an overall improvement in nurses' knowledge and performance after procedural guideline application in relation to infection control measures⁽⁴⁸⁾.

Communication is a basic need to all human beings. In the Hematology Unit, nurses' responsibility to practice effective communication extends beyond the child to include family members, significant others and other members of health team. Nurses must possess effective communication skills as a part of their fundamental nursing knowledge base⁽⁴⁹⁾. The present study showed that the majority of nurses obtained competent level of knowledge about supporting the parent before, immediately and after three months from the standard application. This high level of competency may be due to that nurses are aware that parents are

experiencing many stressors related to the hospitalization of their child such as physical, environmental, psychological and social stressors. Therefore, they are trying to keep open line of communication with parents and with the other members of the health team, in order to ascertain the provision of optimum care to the child.

The findings of the present study are in harmony with **Attia**⁽⁴⁵⁾ (1992) who stated that the majority of nurses demonstrated good scores in their knowledge and performance regarding communication process. **Saker**⁽⁵⁰⁾ (2007) reported that more than half of nurses were competent in communication skills. On the contrary, other studies carried out by **El-Mommani**⁽³³⁾ (2002), **Ahmed**⁽⁴⁷⁾ (1998), and **Mohamed**⁽³⁵⁾ (1991) showed that all nurses included in their studies were unsatisfactory in communication skills.

Nursing documentation continues to be an essential and challenging component of health care delivery. It is anything written or printed out that is relied on as a record or proof for authorized persons. Furthermore, it is a vital aspect of nursing practice and a vital link between the provision and evaluation of health care. To

limit liability, nursing documentation must clearly indicate that individualized, goal-directed nursing care was provided to the child based on the nursing assessment. The information in child's records must describe exactly what happened to the child. This is best achieved when the nurse charts immediately after care is provided. Nurse must carry out documentation in a factual, accurate, complete, current and organized form. Moreover, it must include all assessment findings, interventions, child's responses and referrals in children's records^(51,52).

The current study revealed that documentation was competently fulfilled by 72% of nurses before the standard and all the nurses immediately and after three months from the standard application . Their notes were complete and organized. This finding can be explained in the light that nurses are aware of the importance of documentation for enhancing quality of care, detecting the defects in practice and identifying nurses' responsibilities. Moreover, the availability of standardized forms which can be followed by nurses may be the reason and they had perceived the legal responsibility for ignoring

documentation. This finding was in accordance with **Saker**⁽⁵⁰⁾ (2007) who cited that the majority of nurses demonstrated acceptable level of performance regarding documentation. On the contrary, **Ahmed**⁽⁴⁷⁾ (1998) reported that none of nurses had recorded any marks due to the lack of suitable recording forms. The same result was reported by **Sharaf**⁽⁵³⁾(2002).

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