

## Improving Quality of Nursing Care among school age Children with Thalassemia Major as Regards Blood Transfusion

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### Abstract

**Background:** Children with thalassemia major must be treated with life-long blood transfusions. Quality of care is indicating that the right things are being done right, and is vital in improving the patient outcomes and safety.

**The aim** of this study was to improving quality of nursing care among school age children with thalassemia major as regards blood transfusion. **Research design:** A quasi-experimental research design was utilized in this study.

**Research setting:** The study was conducted at inpatient pediatric departments affiliated to Minia University and General Hospitals.

**Sample:** A purposive sample consisted of two groups: The first group included all nurses (n=20) (13 nurses from Minia University and 7 from General Hospitals) and the second group included school age children with thalassemia major (n=50),

**Tools:** Data were collected through: (1) An interviewing questionnaire which include: sociodemographic data sheet for nurses and school age children with thalassemia, nurse's knowledge sheet and routine blood transfusion knowledge questionnaire (RBTKQ) (2) An observational checklist to assess nurses practices about thalassemia. (3) Patient satisfaction scale.

**Results:** of this study showed significant improvement of nurses knowledge and practices in post-test about thalassemia and blood transfusion in school age children, which improved the patient satisfaction regarding quality of nursing care.

**Conclusion:** after implementation of the program there was remarkable improvement of nurses' knowledge and practices related to thalassemia and blood transfusion, which improved quality of nursing care as well as increased patients' satisfaction.

**The study recommended** that, a specialized orientation program should be developed for newly appointed nurses to prepare them before working at the pediatric departments further studies should be conducted to improve nurses' knowledge and practices regarding to blood transfusion care of children with thalassemia.

**Keywords:** quality of nursing care, school age children, thalassemia major, blood transfusion

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### I. Introduction

Thalassemia is a genetic, autosomal recessive haemoglobinopathic disease, it is found worldwide, but most commonly in the Mediterranean, Thalassemia is the most common inherited disorder in the world that represents a major public concern. It is characterized by a defect in the genes responsible for production of hemoglobin. Hemoglobin is a protein that consists of alpha and beta chains. If the genetic mutations prevent any formation of beta chains then beta-thalassemia occurs which involves abnormal development of red blood cells and eventually anemia (Ali, et al., 2012) and (Ismail, et al., 2013). Beta-thalassemia is caused by any of more than 200 mutations that affect different levels of the beta-globin gene expression by a variety of mechanisms (Higgs, et al., 2012).

Children born with thalassemia major are normal at birth, but develop severe anemia during the first year of life. Other symptoms can include: Bone deformities in the face, fatigue, growth failure, shortness of breath and yellow skin (jaundice) (DeBaun, et al., 2011). Beta-thalassemia major is a chronic disorder of blood, having an extensive impact on life and presenting with hemolytic anemia, growth retardation, hepatosplenomegaly and skeletal abnormalities. It often requires regular blood transfusions, iron chelation therapy and sometimes splenectomy for its management. Thus, the therapeutic regime is complex, lifelong and inconvenient,

requiring repeated hospitalizations and blood transfusions, which often affects the child's physical and mental health negatively (El-Beshlawy, et al., 2007); (Pillitteri, 2014) and (Abu Shosha, 2014).

Blood transfusion is the mainstay of the care for individual with thalassemia major and many with intermediate. The purpose of transfusion is twofold: to improve the anemia and to suppress the ineffective erythropoiesis. Chronic transfusions prevent most of the serious growth, skeletal and neurological complications of thalassemia major (Taylor, et al., 2010). In spite of its vital role in saving lives and enhancing patients' lives, blood transfusion is associated with risks. Making mistakes in blood transfusion and insufficient control of patients who receive blood during the transfusion can lead to death for such patients (Soc Guidelines, 2012). So, standards of safe blood transfusion must be developed and maintained to ensure a safe and rational approach to the use of blood transfusions in the management of these disorders, also careful consideration must be given to the associated dangers (Taylor, et al., 2010). Nurses being responsible for the final bedside check before transfusion, have the final opportunity to prevent a miss transfusion. An understanding and knowledge of the pathophysiology of transfusion reactions, symptoms and treatment is essential to safely administer and monitor transfusions (Aslani, et al., 2010).

Quality of care is indicating that the right things are being done right, improving the outcomes for patients, their families and their communities. The criteria used to assess quality could address structure, process or outcome. It is an optimal balance between possibilities realized and a framework of norms and values. Optimal nurse staffing is a critical component in improving the quality of patient care and preventing complications. The quality of nursing care makes a vital difference in patient outcomes and safety (Aslani, et al., 2010).

Patient's satisfaction has been advocated as an outcome measure of quality nursing care. Determinants of quality of nursing care include: adequate skill, caring attitudes, effective communication, efficient organizational and management systems and effective participation. Nurses need to understand that care cannot be of high quality unless the patient is satisfied. So, patient's satisfaction should thus remain a requirement for obtaining health care goals (American Nursing Association, 2014). The nurse should be aware of his/her responsibility for the quality of care provision to the patients, the institution, ethics, laws and professional standards, as well as performance that contributes to the evaluation of care and the patients' satisfaction (Ndambuki, 2013). The nurse plays a critical role in any team of healthcare professionals involved in the care of patients with chronic diseases including hemoglobin (Hb) disorders such as thalassemia and sickle cell disease. (De Freitas, et al., 2014).

Nurse's education consists of the theoretical and practical training provided to nurses with the purpose to prepare them for their duties as nursing care professionals. It is very important for nursing staff to engage in plenty of ongoing training as well the needs of patients continue to change and there are new developments in procedure, the education of nurses never stops as they are required to continually master new skills and concepts throughout their career (Taher, et al., 2012).

### **1.2 Significant of the study**

Thalassemia represents a major public health problem in Egypt Beta-thalassemia is the most common genetically inherited hemoglobin disorder in Egypt with a carrier rate varying from 5.3 to > 9% as reported by a study (NHLBI, 2013).

School children with thalassemia often requires regular blood transfusions and iron chelation therapy for its management. Thus, the therapeutic regime is complex, lifelong requiring repeated hospitalizations and blood transfusions, which often affects the child's physical and mental health negatively. So nurses having knowledge and health related practices about thalassemia will improve quality of nursing care and improve patient satisfaction among school age children.

### **1.3. Aim of the Study**

The aim of this study was to improving quality of nursing care among school age children with thalassemia major as regards blood transfusion.

**3.4. Research Design:** A quasi-experimental research design was utilized to meet the aim of this study.

## **II. Subjects and Methods**

### **2.1. Setting**

The study was conducted at in-patient pediatric departments affiliated to Minia University and General Hospitals.

### **2.2. Sample**

A purposive sample consisted of two groups: The first group included all nurses (20) (13 nurses from Minia University and 7 nurses from Minia General Hospitals), under the following inclusion criteria: Nurses

who are willing to participate in the study, their ranges from 20 - > 40 years, nurses having experience from one to 20 years, both male and female nurses. Exclusion criteria: Nurses who are having more than 20 years of experience. The second group included of school age children with thalassemia major (n=50), who were attending the above mentioned settings over a period of six months. The inclusion criteria: school age children ranges between 6-12 years from both gender and exclusion of patients suffering from other chronic medical diseases such as; renal failure, rheumatic heart disease, etc.)

### **2.3. Tools and Techniques Used for Data Collection**

**Tool I: A structured designed interviewing questionnaire:** Designed by the researchers after reviewing previous and recent available related literature, it was written in simple Arabic language and **It was consisted the following three parts:**

1. **Part I:** Sociodemographic characteristics for nurses including age, gender, marital status, qualifications and training about thalassemia etc. And school age children age gender, education level and frequency of blood transfusion/year.

2. **Part II:** Nurse's knowledge about thalassemia, including meaning of thalassemia, causes, manifestations, types, complications, treatment and the effect of treatment on body system.

3 **Routine Blood Transfusion Knowledge Questionnaire (RBTKQ)** it was used to assess nurse's knowledge on blood transfusion developed by **Hijji, et al., (2012)** It consisted of 32 items that measure nurse's knowledge about blood transfusion (2 true-false; 20 multiple choice & 10 open questions). This section examines nurse's knowledge aspects of blood bag collection from blood bank and patient preparation prior to transfusion, pre/post transfusion initiation nursing responsibilities, and complications related to blood transfusion.

#### **Scoring system**

For nurse's knowledge about thalassemia and blood transfusion, nurse's knowledge was considered unsatisfied (< 60%, ) while it was considered satisfied if (60% and more)

**Tool II: Comprises the following:**

**a-** Blood transfusion observational checklist to assess nurses practices related to blood transfusion (**Department of Air Force, 2014**).

**b-** Assessment for nursing practices related to assessment of the body system, as measuring of vital signs (measurement of axillary's temperature, pulse and blood pressure) and administration of I.V iron chelation therapy (**Taylor, et al., 2008**).

**Scoring system:** Each item in the previous procedures was classified into two levels; «done» and «not done», if the nurses performed the steps correctly, one point was given, if incorrectly done or not done it at all, zero point was given. According to the actual practice for each study subject, it was categorized into unsatisfied (< 60%), and satisfied (60 % and more).

#### **Tool III: Patient Satisfaction Scale (PSS):**

Developed by **Risser, (1975)**, it was designed to evaluate patients' attitudes towards nurses and nursing care and originally contained three subscales with a total number of 25 items defined as follows:

1. Technical Professional (TP) domain contains seven items concerning technical issues on care and measurement of the nurse's behaviors, the main component of it is; the nurse gives good advice etc.

2. Educational Relationship (ER) domain contains seven items concerning nurse's attitude with patients, the exchange of information between the nurse and patient. The main components of it are; the nurse gives directions at the right speed, the nurse always gives complete enough explanations of why tests are ordered etc.

3. Trusting Relationship (TR) domain approaches contain eleven items concerning interpersonal relationship situations between nurse and patient, the verbal and nonverbal communication that occur between the nurse and patient. The main components of it are; the nurse should be more friendly than she is, the nurse is a person who can understand how I feel, the nurse is pleasant to be around etc.

**Scoring system:** Each question is assessed on a five - point Likert type measurement scale ranging from Strongly agree (1), to Strongly disagree (5). Both positive and negative sentences were included in each subscale. The negative sentences are assessed in reverse and the higher the score indicates the patient satisfaction with the nursing care provided.

**3.2. Reliability of the Tools:** Reliability was applied by the researcher for testing the internal consistency of the tool, by administration of the same tools to the same subjects under similar conditions on one or more occasions. Answers from repeated testing were compared (Test-re-test reliability). Reliability of the tool was performed to confirm its consistency using Cronbach's alpha coefficient method.

**2.4. Validity of the Tools:** The study tools were tested for validity and reliability by a panel of 5 experts in the field of the study to test the content validity of tool and necessary modifications were done.

**2.5. Pilot Study:** A pilot study was carried out on 10% (2 nurses & 5 patients) of the study sample to test tools for clarity and applicability, and to determine the time required for filling in the tools. Data obtained from the pilot study were analyzed and accordingly the necessary modifications on the study tools were done.

#### **2.6. Ethical Considerations**

An explanation of the aim of the study was given to nurses and school age children with thalassemia before their enrollment in the study. An informed written consent was obtained. Each study subject was individually interviewed using the previously mentioned study tools. They were assured that all the collected data would be used for research purpose only. Participants' anonymity, confidentiality, privacy, safety and protection were assured. They were informed that participation is voluntary and that they could withdraw at any time of the study.

#### **2.7 Educational program:**

The education program was designed by the researchers, based on the results obtained from the assessment phase. It was designed to improve nurse's knowledge and practices regarding thalassemia and blood transfusion and to improve patient's satisfaction. The intervention consisted of details about meaning of the disease, causes, manifestations, types and complications on body system; beside, knowledge and practices regarding blood transfusion.

#### **2.8. Field Work**

The actual fieldwork was carried out from the beginning of March 2018 until the end of August 2018, in the previously mentioned settings, The present study was carried out after taking an official permission from the administrators of the study settings at Minia University and General Hospitals, by submission of an official letter issued from the Faculty of Nursing, Minia University and General hospitals, where the aim and expected outcomes of the study were explained clearly. where the researchers was available in the study settings twice/week from 9.00 a.m. to 12.00 p.m. The researchers were introduced themselves to the participant and explained the purpose of the study and its expected outcome, the participant is informed written consent was obtained. the time required for the program implementation was 6 months. One month for pre/post-test, 5 months for implementation of the program. The study group attended 8 sessions; 4 sessions for theory and 4 sessions for practices. The duration of each session ranged between 30-45 minutes. At the beginning of each session, the researchers started by giving a summary about the previous session and explaining the objective of the new one. 4 sessions for theory as the following: the session 1, content: personal interviewing of the studied sample, the aim, duration of the study explained by the researcher through direct personal communication, and pre-test. The session 2, content: definition of thalassemia, causes, manifestations, types. The session 3, content: treatment and complications on body systems. The session 4, content: Nurse's knowledge about blood transfusion. 4 sessions for practice The session 1, content: Nurse's practice regarding blood transfusion, the session 2: assessment of the body system, the session 3: measuring vital signs and the session 4: administration of I.V iron chelation therapy. Different teaching strategies were used including instructions, lectures, brainstorming, group discussion, clinical teaching and demonstration. The teaching aids used were handouts, colored posters and laptop screen show. Each participant gets a copy of the program booklet that included all the educational materials. At the last, post-test format was distributed in order to collect the required data.

#### **Statistical Design:**

Data entry was done using compatible personal computer. The statistically analysis was done using SPSS-20 statistical software package. Data were collected, revised, coded, analyzed, and tabulated using number and percentage distribution. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations for quantitative variables. Quantitative continuous data were compared by using student T-test in case of comparisons between the mean scores of the two studied groups. Qualitative studied variables were compared using Chi-square test. Statistical significance was used at P. value <0.05

### III. Result

**Table 1.** Distribution of nurses' characteristics included in the study (n= 20)

	No	%
<b>Age (in years):</b> 20 : 30	6	30
31: 40	9	45
< 40	5	25
<b>Mean ± SD</b>	33.20± 6.25	
<b>Gender:</b> Male	3	15
Female	17	85
<b>Educational level</b> Nursing diploma	6	30
Technical institute	8	40
Bachelor degree	6	30
<b>Years of experience</b> 1:5 years	11	55
5:10 years	6	30
<10 years	3	15
<b>Training about thalassemia and blood transfusion</b> Yes	0	0
No	20	100

Table 1: Shows the distribution of the nurses according to characteristics. 45% of nurses were in the age group of 31:40 years that the mean age was  $33.20 \pm 6.25$ . Regarding gender 85.0% of nurses were females, 40% of them had technical institute, 55% of nurses had from 1:5 years of experience in in-patient pediatric department, while 100% of them didn't receive any training courses about thalassemia and blood transfusion.

Table 2. Distribution of school age children sociodemographic characteristics and frequency of blood transfusion (n= 50)

	No	%
<b>Age (in years):</b> 6:8 years	19	38
9:12 years	31	62
<b>Mean ± SD</b>	10.20 ± 2.25	
<b>Gender:</b> Male	32	64
Female	18	36
<b>Educational level:</b> Illiterate	0	0
Primary	40	80
Preparatory	10	20
<b>Frequency of blood transfusion/year:</b> < 6 times	17	34
≥ 6 times	33	66

**Table 2:** Shows that age of school children from 9:12 years with thalassemia that the mean age was  $10.20 \pm 2.25$ , 64% were males, 80% were primary level and 66% of them received blood transfusion 6 times or more per year.

**Table 3.** Distribution of nurses knowledge regarding thalassemia and blood transfusion pre/post program implementation (n=20)

Items	Pre test Mean ±SD	Post test Mean ±SD	T- test	P. value
Definition of thalassemia	6.4± 3.3	8.0 ± 2.2	5.3	.01
Manifestation of	5.3± 2.1	7.1 ± 1.3	7.4	.01

thalassemia				
Causes of thalassemia	6.2 ± 4.2	7.6 ± 2.3	10.1	.01
Types of thalassemia	5.3 ± 2.4	8.3 ± 3.2	6.3	.01
Management and instructions given to patients	6.1 ± 5.0	8.4 ± 2.3	3.2	.01
Complications of thalassemia	2.3 ± 2.2	7.1 ± 1.3	5.3	.01
Importance of blood transfusion	4.3 ± 2.0	9.6 ± 3.5	6.4	.01
Side effects of blood transfusion	5.2 ± 3.3	8.3 ± 2.3	6.6	.01
Total knowledge	39.21 ± 23.14	62.24 ± 16.24	12.2	.01

Table 3. illustrates that the distribution of nurses knowledge regarding thalassemia and blood transfusion at pre/post program. This table reveals that their mean scores for knowledge about definition of thalassemia improved pre/post program (from 6.4±3.3 to 8.0±2.2); respectively. Knowledge about manifestation of thalassemia in pre/post program (from 5.3± 2.1 to 7.1 ± 1.3); respectively. As well, knowledge about causes of thalassemia improved pre/post program (from 6.2±4.2 to 7.6±2.3); respectively. As for knowledge related types of thalassemia improved pre/post program (from 5.3±2.4 to 8.3 ± 3.2); respectively. The score of nurses' knowledge about management and instructions given for school age children with thalassemia improved at post/test compared with pre-test (from 6.1±5.0 to 8.4 ± 2.3); respectively. Concerning knowledge related to complications of thalassemia, it improved pre/post program (from 3.87±2.209 to 2.3±2.2); respectively. The total mean score of nurses' knowledge pre/post program was improved (from 39.21±23.14 to 62.24±16.24); respectively. There were statistically significant differences between pre/post program implementation in all items of nurses' knowledge (P < 0.01).

**Table 4.** Distribution of nurses practices regarding thalassemia and blood transfusion pre/post program implementation (n=20)

Items	Pre test Mean ±SD	Post test Mean ±SD	T- test	P. value
Assessment of the body systems	6.4 ± 2.8	10.3 ± 4.1	5.2	.000
Measuring of vital signs	7.3 ± 3.3	13.4 ± 2.5	7.6	.000
Administration of IV iron chelation therapy	8.3 ± 2.5	12.4 ± 2.3	6.2	.000
Nursing role in preparatory phase of blood transfusion	6.4 ± 3.2	14.2 ± 4.4	7.3	.000
Nursing role during blood transfusion phase	5.2 ± 3.5	12.3 ± 2.5	6.4	.000
Nursing role after blood transfusion	7.5 ± 2.7	13.3 ± 2.5	4.8	.000
Total practices	39.21 ± 15.6	74.08 ± 16.22	12.3	.000

Table4: Indicates that there were highly statistically significant differences pre/post program scores in all items of nurses' practice (P < 0.00). There were improvements pre/post program in assessment of body systems, vital signs and administration of IV iron chelation therapy (from 6.4± 2.8 to 10.3 ± 4.1, 7.3± 3.3 to 13.4 ± 2.5, and 8.3 ± 2.5 to 12.4 ± 2.3 ); respectively. As regards nursing role in blood transfusion phases there were improvements in the nurses' practice in preparatory phase, during and after blood transfusion at post program compared with pre program (from 6.4 ± 3.2 to 14.2 ± 4.4, 5.2 ± 3.5 to 12.3 ± 2.5, and 7.5 ± 2.7 to 13.3 ± 2.5 ); respectively. Concerning total scores of nurses' practice for school age children with thalassemia, these were a highly statistically significant improvement between pre/post program implementation (39.21 ± 15.6 to 74.08 ± 16.22); respectively.

**Table (5):** Distribution of patient satisfaction scale pre/post program implementation no= 50

Patient satisfaction Scales	Pre- test		Post-test		T. test	P. value
	No	%	No	%		
- Poor Satisfaction regarding to quality of nursing care	42	84	7	14	5.3	0.02

- Moderate Satisfaction regarding to quality of nursing care	6	12	36	72	6.2	0.01
- Good Satisfaction regarding to quality of nursing care	2	4	7	14	4.2	0.03

Table (5) shows distribution of patient satisfaction scale pre/post program implementation . It was evident that poor satisfaction regarding to quality of nursing care was 84% in pre/test and 14 % in post/test, moderate satisfaction regarding to quality of nursing care was 12% in pre/test and 72% in post/test and good satisfaction regarding to quality of nursing care was 4% in pre/test and 14% in post/test. However, this increase reached statistically significant difference between poor, moderate, and good satisfaction regarding to quality of nursing care pre/post program implementation (P. 0.02, 0.01, and 0.03); respectively.

**Table (6):** The relation between the nurses knowledge about thalassemia, blood transfusion and their characteristics n= 20

Items	Knowledge								P. value
	Pre/test				Post/test				
	Satisfactory		Un Satisfactory		Satisfactory		Un Satisfactory		
	No	%	No	%	No	%	No	%	
<b>Age in years of mothers</b>									$X^2=0.82$ 0.01
- 20 : 30	2	10	4	20	5	25	1	5	
- 31: 40	3	15	6	30	7	35	2	10	
- 40 and more	2	10	3	15	4	20	1	5	
<b>Gender:</b>									$X^2=0.85$ 0.02
Male	1	5	2	10	3	15	0	0	
Female	11	55	6	30	15	75	2	10	
<b>Educational level</b>									$X^2=0.75$ 0.01
Nursing diploma	2	10	4	20	4	20	2	10	
Technical institute	5	25	3	15	7	35	1	5	
Bachelor degree	3	13	3	15	6	30	0	0	
<b>Years of experience</b>									$X^2=0.80$ 0.01
1:5 years	5	25	6	30	8	40	3	15	
5:10 years	3	15	3	15	6	30	0	0	
<10 years	1	5	2	10	3	15	0	0	
<b>Training about thalassemia and blood transfusion</b>									$X^2=0.75$ 0.01
Yes	0	0	0	0	0	0	0	0	
No	9	45	11	55	17	85	3	15	

\*= Significant

Table 6. illustrates, the relation between the studied nurses knowledge about thalassemia, blood transfusion and their characteristics. It indicates an increase in satisfactory knowledge of nurses age from 31:40 years were 15% in pre/test and increase to 35% in post/test, satisfactory knowledge of nurses who have Technical institute in pre/test was 25% and increase to 35% in post/test, satisfactory knowledge of nurses who didn't attended training about thalassemia and blood transfusion 45% in pre/test and increase to 85% in post/test. However, this increase reached statistically significant difference between the mothers age, formal education and residence their knowledge (P. 0.01, 0.01, and 0.01); respectively.

**Table (7):** The relation between the nurses practices about thalassemia, blood transfusion and their characteristics n= 20

Items	Knowledge								P. value
	Pre/test				Post/test				
	Satisfactory		Un Satisfactory		Satisfactory		Un Satisfactory		
	No	%	No	%	No	%	No	%	
<b>Age in years of mothers</b>									$X^2=0.80$ 0.02
- 20 : 30	3	15	3	15	6	30	0	0	
- 31: 40	4	20	5	25	8	40	1	5	
- 40 and more	2	10	3	15	4	20	1	5	

<b>Gender:</b>	2	10	1	5	3	15	0	0	$\chi^2=0.80$ 0.03
Male									
Female	4	20	13	65	15	75	2	10	$\chi^2=0.77$ 0.02
<b>Educational level</b>									
Nursing diploma	3	15	3	15	6	30	0	0	
Technical institute	5	25	3	15	8	40	0	0	
Bachelor degree	4	20	2	10	6	30	0	0	$\chi^2=0.87$ 0.02
<b>Years of experience</b>									
1:5 years	5	25	6	30	9	45	2	10	
5:10 years	3	15	3	15	6	30	0	0	
<10 years	1	5	2	10	3	15	0	0	$\chi^2=0.75$ 0.02
<b>Training about thalassemia and blood transfusion</b>									
Yes	0	0	0	0	0	0	0	0	
No	7	35	13	65	17	85	3	15	

Table 7. illustrates, the relation between the studied nurses practices about thalassemia, blood transfusion and their characteristics. It indicates an increase in satisfactory practices of nurses age from 31:40 years were 20% in pre/test and increase to 40% in post/test, satisfactory practices of nurses who have Technical institute in pre/test was 25% and increase to 40% in post/test, satisfactory practices of nurses who didn't attended training about thalassemia and blood transfusion 35% in pre/test and increase to 85% in post/test. However, this increase reached statistically significant difference between the mothers age, formal education and residence their knowledge (P. 0.02, 0.02, and 0.02); respectively.

**Table (8):** The correlation between the total scores of nurses knowledge and practices of nurses in pre/ post-test program implementation n=20

\*=Significant

Pre-test	Post-test	
	Correlation Coefficient (r)	P. value
Knowledge	0.96	0.000*
Practices	0.98	0.000*

Table 8. this table shows the correlation between the total scores of nurses knowledge and practices in pre/ post-test program implementation. It is evident that the highest strong positive statistical significant correlation was found between the total scores of knowledge, practices in pre/post-test program implementation of nurses about thalassemia and blood transfusion (r=0.96 and 0.98); respectively.

#### IV. Discussion

Thalassemia major is a chronic genetic blood disorder caused by deficient synthesis of one or more hemoglobin polypeptide chains, which is passed down from generation to generation (**Khan, et al., 2009**) and (**Surapolchai, et al., 2010**). Beta thalassemia is the most severe form of thalassemia. The World Health Organization (WHO) has introduced thalassemia as the most common chronic genetic disorder in 60 global countries. WHO has also addressed improved quality of life. Health-Related Quality of Life (HRQOL) is a broad multidimensional concept that usually includes self-reported measures of physical and mental health (**Yousef, et al., 2006**).

Thalassemia is a complex group of diseases common in Mediterranean regions and Southeast Asia. Worldwide, there are 350,000 births per year with serious hemoglobinopathies. Blood transfusion is the mainstay of care for individuals with thalassemia major (**Soc Guidelines, 2012**).

The nurse plays a vital role in the care of patients with thalassemia. It is therefore of the utmost importance to have a nursing service. Nurses are also essential in helping thalassemic patients to become aware in their own condition, teaching effective techniques for self management, the prevention of complications and the transition of pediatric patients to the adult team of healthcare specialists, as well as in genetic counseling (**Elsayed & Abd El-Gawad, 2015**).

The aim of this study was to improving quality of nursing care of school age children with thalassemia major as regards blood transfusion.

In the present study, 45% of nurses age from 31: 40 years, 1:5 years experience, and 40% of nursing have technical institute education level. **Elewa & Ahmed, (2017)** who stated that, nearly half of them their age ranged between 30 - < 40 years, more than two fifth of them had experience less than 5 years less than three quarter were diploma holders which might elaborate the current condition of nursing qualification, followed by technical institute graduates. These findings were in agreement with that of a study conducted by **Elkattan,**



(2013), who found that more than two thirds of the total sample under study had experience less than 10 years. This might be due to that the most common age group of the studied nurses is in the youngest age group ranging between 18- < 30 years. And **Shafik and Abd Allah, (2015)**, mentioned that most of the study sample were having experience from 5 - < 10 years, in hematology units.

In the present study all nurses who didn't attending training program related to thalassemia and blood transfusion which may be attributed to the shortage in nursing staff, so these departments can't let them attend any training courses to prevent interruption of work due to their absenteeism or this may be due to that the departments do not carry out training programs for nurses. This finding was supported by the result of a study conducted by **Elewa & Ahmed, (2017)** who stated that, more than two thirds of studied nurses who didn't attend training program related to thalassemia and blood transfusion. And in agreement with **Salem (2013)**, who stated that more than three quarters of nurses did not receive any training courses.

In the presents study As regards school age children with thalassemia characteristics, more than half school age children age from 9:12 years. **Elewa & Ahmed, (2017)** who stated that, two fifth of the study sample were having less than 12 years.

In present study 64 % of school age children with thalassemia was male sex. The male affected more than female. the finding of the present study revealed that, both males and females are affected with more male predominance than females, this may be attributed to the fact that thalassemia are genetic blood disorders that affect both males and females. This study result doesn't agreement with **Elewa & Ahmed, (2017)** who stated that, females affected more than males.

The present study refers to the majority of the study sample receive blood transfusion equal and more than six times per year, this refers to that blood transfusion is the first and mainstay of care for individuals with thalassemia major and chronic transfusions prevent most of the serious growth, skeletal and neurological complications of thalassemia major. This study result is in agreement with **Northern California Comprehensive Thalassemia Center, (2012)**, which stated that the aim of transfusion therapy is to permit normal growth, activity level, and to prevent skeletal changes associated with bone marrow hyperplasia. Adequate transfusion therapy will also reduce splenomegaly, hypersplenism and decrease absorption of dietary iron. And in agreement with **Elewa & Ahmed, (2017)** who stated that, the majority of the study sample receive blood transfusion equal and more than six times per year, this refers to that blood transfusion is the first and mainstay of care for individuals with thalassemia major and chronic transfusions prevent most of the serious growth, skeletal and neurological complications of thalassemia major.

Regarding nurses' knowledge of thalassemia and blood transfusion, the present study showed a significant improvement in all items of knowledge and practice among the studied nurses after the educational program implementation and this led to improvement of patients' outcomes. This improvement may be due to many reasons as, knowledge refreshment through the program sessions, relevance of the items of the program content, clarity of program materials and easy language of the educational program. This result is congruent with **Aslani et al., (2010)**, who showed that nurses' knowledge and practice of using needles with appropriate diameter was good but they did not have correct and scientific knowledge of indications and method of heating blood. In addition, **Khouri, (2011)** founded that the education may enhance the capacity of nurses to be effective caring practitioners. Additionally, **Hijji et al., (2012)** highlighted that preventing and recognizing a transfusion reaction requires nurses to have adequate knowledge.

The unsatisfactory knowledge of the studied nurses in the present study before implementation of the educational program may be due to lack of preparation during the basic education or lack of desire of nurses to acquire new knowledge, overload in the working situation and lack of continuous educational courses related to care of patient with thalassemia under blood transfusion. Nurses play a significant role in correct, scientific and safe usage of blood and its components and if they can do them correctly, the probability of incidence of blood transfusion risks will be reduced to minimum as identified by (**Aslani et al., 2010**).

The present study revealed that there were statistically significant differences between pre/post educational program regarding to nurses' practice namely physical assessment, measuring vital signs, administration of iron chelation therapy and blood transfusion. These results may be due to the positive effect of the educational program, which improved nurses' practice. In the same line, the incompetence in nurses' level of practice pre implementation of the educational program may be due to lack of supervision, neglect from nurses, shortage of qualified staff, as well as shortage of an orientation program for the nurses. This study findings were supported by those of **Alomar (2012)** and **Deborah and Corcoran, (2011)**, who stated that as regards total nurses' practice near two thirds of the study nurses had unsatisfactory practice regarding nursing management of patients during nurses assessme.

Patients' satisfaction is generally accepted as a crucial indicator of the quality and effectiveness of nursing care. This study result showed that the majority of patients were not satisfied for quality of nursing care pre-test program, which improved in post-test program. This result may be due to the effectiveness of the educational program that reflected on the improvement of nurses' knowledge and practices which in turn can effect on

patients' outcomes and satisfaction. This result agreed with **Ndambuki (2013)**, who reported that, the quality of care provided to patients can be improved through education and a better understanding and appreciation of nursing art.

This study finding revealed that there was a statistically significant correlation between total score of nurses' knowledge and practice pre-test program implementation and age, years of experience. As well, the result of this study showed that there was a significant correlation between the educational level and total score of nurses' knowledge and practice. This may be due to 40% of the studied nurses had technical institute in nursing, which might elaborate the current condition of nursing qualification. These results were supported by **Deborah and Corcoran (2011)**, who reported that, there is a positive relation between nurses' knowledge, nursing practice and level of education which affect quality of nursing care that the patients receive so, the standard of quality of nursing care was affected by the nurses' level of education. This result is supported by **Shafik and AbdAllah (2015)**, who stated that, the greater the years of experience of the nurses, the greater their knowledge and practices.

The present study finding revealed that, there was a statistically significant correlation between total score of nurses' knowledge and practices which indicates the positive relation between knowledge and practices. This result refers to the level of practice influenced by the level of knowledge. However, without proper knowledge nurses may initiate a transfusion at a rate either slower or faster than recommended. The outcome of this could be either prolongation of the transfusion duration with an increased risk of bacterial contamination or the occurrence of severe transfusion reaction and increase in patient satisfaction and improving of quality of nursing care. This study finding is in accordance with **Hunter, (2010)**, who identified that most importantly, nurses can learn as many skills, but all of that would be a waste if they don't implement the skills in their clinical practices.

## V. Conclusion

The implementation of educational program had a positive effect on nurses' knowledge and practices related to thalassemia and blood transfusion in school age children, which improved the quality of nursing care, as well as increased patient satisfaction.

## VI. Recommendations

Based upon the results of the current study, the following recommendations are suggested - A specialized orientation program should be developed for newly appointed nurses to prepare them before working at the pediatric departments. Further studies should be conducted to improve nurses' knowledge and practices regarding to blood transfusion and care of children with thalassemia. Developing and performing an in-service training program for nurses emphasizing the weak points to increase their knowledge and practices and continuously supervise this task.

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