

Effect of Video-Assisted Teaching Intervention on Nurses' Knowledge and Practices regarding Pediatric Blood Transfusion-Dependent β -Thalassemia Major

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Abstract

Background: Pediatric β -thalassemia major requires lifelong blood transfusions to be treated. As a result, pediatric nurses must practice safely and professionally. **Aim:** To evaluate the effect of video-assisted teaching intervention on nurses' knowledge and practices regarding pediatric blood transfusion-dependent β -thalassemia major. **Methods:** **Design:** A quasi-experimental research design was used to achieve the current study. **Settings:** The study was conducted at inpatient and out-patient pediatric departments affiliated to Sohag University Hospitals. **Subjects:** A convenient sample of 60 nurses who worked at the previously mentioned settings was included. **Tools of data collection:** **Tool 1:** A structured interviewing questionnaire, it consisted of three parts; part 1: Nurses' personal characteristics, part 2: Children' personal characteristics, and part 3: Nurses' knowledge regarding pediatric blood transfusion-dependent β -thalassemia major; **Tool 2:** Routine Blood Transfusion Knowledge Questionnaire to assess nurse 'knowledge about blood transfusion; and **Tool (3):** An observational checklists to assess nurses' practices regarding pediatric transfusion-dependent β -thalassemia major. **Results:** There was a significant improvement in nurses' total knowledge and practices regarding pediatric blood transfusion-dependent β -thalassemia major after video-assisted teaching intervention. Also, there was a positive correlation between total nurses' knowledge and practices post-implementation of the video-assisted teaching intervention. **Conclusion:** It can be concluded that the research hypotheses are accepted; video-assisted teaching intervention had a positive effect on the improvement of nurses' knowledge and practices regarding pediatric transfusion-dependent β -thalassemia major, which reflected that the video-assisted teaching intervention is an effective teaching method. **Recommendation:** The study recommended that using the video-assisted teaching intervention for nurses caring for children with transfusion-dependent β -thalassemia major to promote and improve their knowledge and ensure competent level of practice.

Keywords: Video-Assisted Teaching Intervention, Nurses' Knowledge and Practice, Pediatric blood transfusion-dependent β -thalassemia major

Introduction:

Thalassemia is a hereditary condition in which the production of hemoglobin is faulty and is occurred as a result of a problem with alpha or beta chain synthesis (**Quirolo and Vichinsky, 2021**). Problems emerge in children with thalassemia due to a lack of good hemoglobin, which the body requires to become adequately oxygenated, it divided to two primary types of thalassemia are alpha and beta-thalassemia, which are further subdivided into subgroups (**Arbabisarjou et al., 2015**).

In Egypt, β -thalassemia major is a prevalent health concern; it is predicted that 1000 children with β -thalassemia are born per 1.5 million live births per year. While, the carrier

rate of β -thalassemia was reported to be 9–10%. β -thalassemia has severe physical, social, psychological, congenital, and economic consequences on children and their families (**Tubman et al., 2015**). Physical issues such as chronic anemia, bone deformation, development changes, low stature, and delayed physical maturation, on the one hand, and unpleasant as well as extensive and repetitive therapies, on the other have an impact on several parts of children's lives (**Wong et al., 2020**).

Thalassemia must be treated with regular blood transfusions for the rest of one's life (**Coifman et al., 2014**). Iatrogenic hemosiderosis, which results from the accumulation of iron in many tissues and is lethal in thalassemic children, can be caused by

long-term blood transfusions. Iron chelation therapy is required to prevent future organ damage as a major consequence of blood transfusion-related iron buildup (Elalfy et al., 2019; Kwiatkowski, 2019).

Individuals with thalassemia major and many with intermediate require blood transfusions as a mainstay of treatment. Transfusions have two purposes: to improve anemia and to decrease inefficient erythropoiesis. Chronic transfusions avoid the majority of thalassemia major's substantial growth, skeletal, and neurological issues. Transfusion-related problems, on the other hand, constitute a major source of morbidity once they begin. To provide a safe and sensible approach to the use of blood transfusions in the management of these rare illnesses, standards must be set and maintained. Inability to compensate for low haemoglobin (evidence of increased heart effort, tachycardia, perspiration, poor feeding, and poor growth) or, less typically, growing symptoms of inefficient erythropoiesis lead to the decision to start transfusions (bone changes, massive splenomegaly). The appearance of anemia should not be the exclusive criterion for initiating continuous transfusion (Center for Disease Control and Prevention, 2021).

The patient, family, and medical team all have an important role to play in the decision to start continuous transfusion therapy. Anemia by itself is not a sign that a continuous transfusion is necessary. Anemia should be associated with a considerable decrease in quality of life or morbidity. Poor growth; inability to maintain daily routines and activities such as going to school and work; signs of organ failure; signs of heart disease; pulmonary hypertension; and dysmorphic bone abnormalities are all factors to examine. When the haemoglobin level is well below 6 g/dL, the decision to start regular transfusions is obvious. Anemia caused by sepsis or viral infection must be ruled out before a child's requirement for routine transfusions due to thalassemia can be determined. Withholding transfusions and monitoring weekly haemoglobin levels are two ways to assess. Regular transfusions should be started if the haemoglobin dips below 7 g/dL on two occasions, two weeks apart. In the case of development limitation, noticeable skeletal

abnormalities, or extramedullary hematopoiesis, children with haemoglobin levels less than 7 g/dL may require regular transfusions (Center for Disease Control and Prevention, 2021).

The pediatric nurse can play a vital role in the care of children with β -thalassemia (Baraz et al., 2016). Nurses provide experienced, skilled support and encouragement throughout and often standardized treatment regimes. In particular, nurses should be sure that children and their families are educated about their disease and the treatment options available (Ahmadi et al., 2014).

All pediatric nurses who deal with -thalassemia need to be educated and trained. Pediatric nurse practitioners are specially trained to manage children with -thalassemia, to fulfill their unique needs, and to counsel all family members on preventive treatment and significant sequelae. Every child with thalassemia is evaluated by a pediatric nurse practitioner during routine transfusion appointments under the supervision of a hematologist (Kiani et al., 2016). A nurse provides continuing education and monitors compliance with chelation therapy (Shahramian et al., 2013). They also, provide support regarding the diagnosis and therapy and identify all necessary resources for the family (Baraz et al., 2016).

The use of video-assisted teaching methods opens up a lot of possibilities for study into a new manner of raising awareness. It also aids in the development of good improvements in knowledge and the practice of dealing with life-threatening circumstances. The use of video education to train staff nurses would help them expand and polish their existing skills and knowledge, resulting in an improvement in the quality of care (Kavitha, 2016).

Because nurses work in different shifts and do not have the opportunity to engage in face-to-face teaching sessions, ongoing education and upgrading of their knowledge and practices are critical. Online learning and video-assisted teaching modules have arisen as new ways to provide continuing education to nurses (Safwat & Khorais, 2018).

Various teaching strategies, such as lecture, demonstration, discussion, self-education, and

video-assisted teaching strategy, are utilized to improve nurses' knowledge and practice. Electronically collecting, recording, storing, transmitting, and rebuilding a sequence of images representing scenes in motion is referred to as video. It also aids in the removal of linguistic barriers because images communicate without the use of words (**Balasubramanian et al., 2018**).

Because video-assisted teaching method uses sight, sound, and motion to give easy clarifications of complicated topics and concerns, the video teaching technique helps nurses learn more effectively. It can also provide information in ways that verbal descriptions or speech alone cannot, and it can operate as a bridge between educational divides. Nurses with limited reading abilities, on the other hand, will benefit from the film (**Devi et al., 2019**). Furthermore, video-assisted teaching method is one of the most essential growing technologies for nurses, particularly those who perform difficult procedures (**Hassan, 2019**).

Technology has had a significant impact on the demand for enhanced nursing teaching and learning approaches. Diverse strategies and modern methods are required for the teaching of various talents. As a result, video-based education is thought to be an appropriate teaching method. The voice of the presenter can be heard, which is an advantage of video-based education. Figures, gestures, pictures, and demonstrations are also visible (**Rubi & Rani, 2016**).

Significance of the study

β -thalassemia major is a serious early-onset blood condition that causes severe anemia and necessitates repeated blood transfusions (Arbabisarjou et al., 2015). β -Thalassemia is the most common hemoglobinopathy in Egypt. This disease has a carrier rate of 5.3-9 percent, with a gene frequency of 0.03 percent. It is estimated that 1000/1.5 million live births per year are affected by thalassemia illness (**Tubman et al., 2015**). Depending on the severity of the condition, children with transfusion-dependent thalassemia should get blood transfusions once or twice a month. This may cause them to spend the entire transfusion day in the hospital, disrupting their education and social lives in the process (**Coifman et al., 2014**).

In nursing education, the use of video teaching methods provides an accessible and innovative way to engage today's nursing staff. Video teaching intervention can be easily included in nursing education at any level and is seen as an important component of nursing education that connects theory and practice. Nurses are now required to employ innovative technologies to enhance the learning environment (**Devi et al., 2019**). So, the current study was conducted to evaluate the effect of a video-assisted teaching intervention on nurses' knowledge and practices regarding pediatric blood transfusion-dependent β -thalassemia major.

Aim of the study:

The current study aimed to evaluate the effect of video-assisted teaching intervention on nurses' knowledge and practices regarding pediatric blood transfusion-dependent β -thalassemia major through:

1. Assessing the baseline nurses' knowledge and practices regarding pediatric blood transfusion-dependent β -thalassemia major
2. Designing and implementing video-assisted teaching intervention regarding pediatric blood transfusion-dependent β -thalassemia major based on the nurses' actual needs.
3. Evaluating the effect of video-assisted teaching intervention on nurses' knowledge and practices regarding pediatric blood transfusion-dependent β -thalassemia major.

Research hypotheses:

- H1:** Nurses who received video-assisted teaching intervention will have satisfactory knowledge regarding pediatric transfusion-dependent β -thalassemia major post-intervention than pre-intervention.
- H2:** Nurses who are exposed to video-assisted teaching intervention will have adequate practices regarding pediatric transfusion-dependent β -thalassemia major post-intervention than pre-intervention.

Subjects and Methods:

Research design:

A quasi-experimental research design was used to achieve the current study. Patients self-

select or are randomly assigned to one of many therapy groups in a quasi-experimental study to examine the real effectiveness and safety of non-randomized treatments (Maciejewski, 2020).

Settings:

The study was carried out in inpatient and out-patient pediatric departments affiliated to Sohag University Hospitals which are located on the ground floor of the outpatient building. It consists of one room for examination and nursing staff. Also, there was a waiting area for pediatric patients and a lecture room which included an adequate number of seats, and data show where the researchers interviewed the recruited nurses, while the out-patient pediatric department in Sohag University Hospital which is located on the second floor of the hospital. They consist of four rooms. The first room included (6) beds, the second room included (8) beds, the third room included (4) beds and the fourth room comprised (4) beds. These settings were selected due to the high prevalence of pediatric patients in the previously selected setting, as well as the fact that it serves the most populous region of the country.

Subjects:

A convenient sample of 60 nurses who worked at the previously mentioned settings was included.

Sample calculation:

A convenient sample of (60) nurses working in the previously mentioned study settings was included in this study. The sample size was calculated using the following assumptions: Z_1 (95% confidence interval) = 1.96, Z_2 (80% test power) = 0.84, S = estimation of the standard deviation score for each variable and $d = 0.60$.

Tools of data collection:

Tool 1: A structured interviewing questionnaire was designed by the researchers in simple Arabic language after reviewing related literature; it consisted of three parts;

Part 1: It included information related to nurses' personal characteristics such as age, gender, academic qualifications, years of experience, previous training.

Part 2: It included information related to children's personal characteristics such as age, gender, educational level, duration of illness, and frequency of blood transfusion.

Part 3: It included information related to nurses' knowledge regarding pediatric transfusion-dependent β -thalassemia major such as definition, causes, clinical manifestations, diagnostic evaluation, complications, and management of thalassemia major in children

Tool 2: Routine Blood Transfusion Knowledge Questionnaire (RBTKQ) was used to assess nurses' practical knowledge about blood transfusion it was developed by Hijji, et al., (2012). It consisted of 30 items that measure nurses' knowledge about blood transfusion (2 true-false, 18 MCQ & 10 open-ended questions). It is concerned with assessing nurses' knowledge of blood bag collection from the blood bank, child preparation before transfusion, nursing responsibilities pre & post blood transfusion as well as its complications.

Scoring system:

The scoring system for nurses' knowledge was evaluated upon fulfillment of the interviewing questionnaire as the nurses' knowledge was checked with a model key answer. Therefore, correct answers scored (1), and incorrect or do not know answers scored (0). The total score ranged from 0-30. Nurses' total knowledge was assigned into $\geq 75\%$ was considered a satisfactory level of knowledge, a score which less than 75% was considered an unsatisfactory level of knowledge.

Tool (3): Observational checklists were used to assess studied nurses' practices regarding pediatric blood transfusion-dependent β -thalassemia major.

- **Blood transfusion observational checklist** was adopted from Cowell, (2009) and de Mattia, (2016). It was used to assess nurses' practices as regards care of children receiving blood transfusion included (29 steps), distributed as nurses' practices before blood transfusion (11 steps), during blood transfusion (10 steps), and after blood transfusion (8 steps).

- **Vital signs measurements and administration of I.V iron chelation therapy observational checklists** were adopted from Taylor et al., (2008).

Scoring system for nurses' practice:

A score of (1) for the step correctly done, and a score of (0) for not done. Total practice scores converted into percent score where the score of $\geq 85\%$ considered competent level of practice and a score $< 85\%$ considered incompetent level of practice.

Procedures

Preparatory phase:

The researchers used books, evidence-based articles, periodicals, and magazines of line reference to review local and international related literature related to pediatric transfusion-dependent -thalassemia major and develop these study tools by using books, evidence-based articles, periodicals, and magazines of line reference and designing videos that were used for study intervention. This phase took a time from the beginning of March 2021 to the end of April 2021, this period was in effect.

Content validity:

Content validity of the study tools was assessed and ascertained by a panel of five experts including three in the Pediatric Nursing field and two in the Pediatric medicine field to validate its format, layout, consistency, accuracy, and relevance. No modifications were made according to the panel judgment to ensure sentence clarity and content appropriateness.

Tools' reliability:

Internal consistency reliability of all items of the tools was assessed using Cronbach's Alpha test. It was 0.83 for the structured interviewed questionnaire and 0.86 for the observational checklists.

Ethical considerations:

Official permission was obtained from directors of the previously mentioned settings before starting the study. All studied nurses gave their verbal consent before conducting the study to participate in the present study after informing them about the nature and aim of the study. Confidentiality was ensured throughout

the study process and their data was used for research purposes only and had the right to withdraw from the study at any time.

Pilot study:

The pilot study was carried out on 10% of the studied subject (6 nurses) over one month (May 2021) to ascertain the clarity and applicability of the tools. Regarding the results of the pilot, no modifications to the study tools were made and pilot study subjects were included in the study sample.

Fieldwork:

Fieldwork: Data collection period was carried out for 6 months, from the beginning of June 2021 to the end of November 2021. The researchers were available three days per week (from Sunday to Tuesday) during the morning shift. The video-assisted teaching program was implemented through the following phases:

Assessment phase:

This phase started with meeting the studied nurses, at the beginning of the interview the researchers introduced themselves to the studied nurses and explained the nature and aim of the study as well as the content of the video-assisted teaching program. Each nurse was interviewed individually to assess her knowledge regarding pediatric transfusion-dependent β -thalassemia major (pre-video-assisted teaching intervention) using the structured interviewing questionnaire (tool 1 and tool 2). The average time required for completion of both tools was around 20-30 minutes. Meanwhile, studied nurses' practices regarding pediatric transfusion-dependent β -thalassemia major were assessed by the researchers during their actual practices with children; this part took about four weeks. Then studied nurses were divided into ten groups, each group consisted of 6 nurses. This period of pre-test (knowledge and practice) took one month (June 2021).

Planning phase:

The videos were designed by the researchers after reviewing the literature and based on the needs identified in the assessment phase. It was designed to improve nurses' knowledge and practices regarding pediatric transfusion-dependent β -thalassemia major

Videos in the current study were constructed by the researchers using the following steps:

- 1- Review of literature and data collection.
- 2- Preparation and organization of the content.
- 3- Preparation of the video script by sequence.
- 4- Research the story.
- 5- Recording the videos.
- 6- Editing the videos.
- 7- Evaluating the videos.

1- Review of literature and data collection:

Before beginning the video-assisted teaching intervention an extensive literature review was undertaken from textbooks, journals, online sources, and periodicals pediatric transfusion-dependent β -thalassemia major to prepare the videos. The literature review gives a critical summary of the topic of interest. Also, careful attention to ensure that the content was accurate, up to date, logically organized, simple and clear.

2- Preparation and organization of the content:

The content of the videos was prepared and organized under various heading according to the study objectives.

3- Preparation of the video script by sequence:

A script was made according to the prepared contents. It consisted of all scenes included in the videos such as the aim, objectives, principles, and steps of blood transfusion-dependent β -thalassemia major. Videos script is a kind of map, a blueprint of what is going to be in the videos.

4- Research the study:

Nurses were interviewed by the researchers; make a note of their knowledge and practice of care while communicating with them through open-ended questions. Observe and make a note in which area they lack information.

5- Recording the videos:

The video is suited by the researchers in the (clinical lab) setting for the practical part and PowerPoint video record for the theoretical part according to the prepared script.

- The theoretical and practical videos begin in a motivating and interesting manner and meet the study objectives.
- All steps of the pediatric blood transfusion-dependent β -thalassemia major procedure in the videos were presented in a simplified way and accurate using simple and clear language that suits the nurses' educational level.
- The important contents were summarized at the end of each video.

The video includes section breaks and section titles.

- The video had acceptable technical quality.
- The length and pace of each video are appropriate.
- The video meets the study objectives.

6- Editing the videos:

Videos editing is the process of manipulating and rearranging video shots. The goals of editing are to remove unwanted footage, choose the best footage, create a flow add effects, graphics, music, alter the style, pace, or mood of the video, give the video a particular angle then watch it and take notes. Titles, music, sound editing, color correction, and effects were added. The prepared videos were edited by a video expert.

7- Evaluating the videos:

The videos were evaluated by three experts in the field of pediatric nursing. Their critique, suggestion, opinion, and recommendation were accepted and made.

The general objectives of the video-assisted teaching intervention were to improve nurses' knowledge and practice regarding pediatric transfusion-dependent β -thalassemia major.

Specific objectives:

At the end of video-assisted teaching intervention the studied nurses were able to:

- Define β -thalassemia major
- List causes of β -thalassemia major
- List clinical manifestations of β -thalassemia major
- Mention complications of β -thalassemia major

- Explain the management of β -thalassemia major
- Define blood transfusion
- Illustrate the importance of blood transfusion
- Understand the indication and contraindication of blood transfusion
- Explain principles for blood transfusion
- Enumerate hazards of blood transfusion for pediatric B-thalassemia major
- Explain preparation blood transfusion
- Demonstrate steps of blood transfusion
- Explain steps during and after the blood transfusion.
- Discuss nursing care practices before, during, and after blood transfusion as well as measuring vital signs and IV iron chelation therapy
- Mention precautions are taken in blood transfusion
- Apply infection control measures for blood transfusion.

Implementation phase:

The implementation phase was achieved through five sessions at a period of four months beginning from (July 2021 till the end of October 2021). Five videos were containing the study objectives and were carried out through (5) videos sessions (Two videos for the theoretical part and three videos for the practical part). They were divided into ten groups of six nurses in each video session. A schedule suitable for nurses was developed including the date, time, place, topics, and duration of each video session. The duration of video sessions for each theoretical and practical session ranged from 40-45 minutes for three days per week (Sunday, Monday, and Tuesday) in the morning shift. The theoretical video sessions were started from 11:00 AM to 11.45 PM. The theoretical video sessions focused on knowledge about the definition of β -thalassemia major, its causes, clinical manifestations, complications, and management, in addition to precautions and hazards of blood transfusion for pediatric B-thalassemia major.

The researchers continued to reinforce the acquired information, answered any raised questions, and gave feedback. The videos were projected to the nurses using a laptop and data show. The practical sessions were started on the same 3 days from 12.30 PM to 1.30 PM. The

practical parts cover the procedures related to nursing care practices before, during, and after blood transfusion as well as measuring vital signs and IV iron chelation therapy were demonstrated to the studied nurses during the practical sessions. Video-assisted teaching intervention helps in explaining complex information, using simple and apparent language to suit the nurses. Also, provide the nurses with the information they need when required it, and in an interactive format. Motivation and reinforcement during video sessions were used to enhance sharing in this study.

Contents of each video in all sessions:

The first theoretical video session focused on:

- Introduction about β -thalassemia major
- Definition of β -thalassemia major
- Causes of β -thalassemia major
- Clinical manifestations of β -thalassemia major
- Complications of β -thalassemia major
- Management of β -thalassemia major

The second theoretical video session focused on:

- Definition blood transfusion
- Importance of blood transfusion
- Indication and contraindication of blood transfusion
- Principles for blood transfusion
- Precautions of blood transfusion during β -thalassemia major
- Hazards of blood transfusion for pediatric B-thalassemia major

The third practical video session focused on:

- Preparation for blood transfusion
- Administration of blood transfusion
- Precautions during and after the blood transfusion.

The fourth practical video session focused on:

Nursing care practices before, during, and after blood transfusion as well as measuring vital signs and IV iron chelation therapy

The fifth practical video session focused on:

Infection control measures for blood transfusion. Following the video-based demonstration and practice, while watching sessions, real-lifetime simulations were practiced to reinforce the skills learned during

the video session. Moreover, the importance of teamwork and coordination was also experienced by nurses in these simulation sessions. Nurses were provided a flash drive of all videos. Video also formally advertised, through email for each nurse.

Evaluation phase:

After the implementation of video-assisted teaching intervention, the nurses' knowledge and practices were evaluated. This phase took about one month (November 2021) and reevaluates the studied nurses using the same tools to evaluate the effect of video-assisted teaching intervention on nurses' knowledge and practices regarding Pediatric Transfusion-Dependent β -Thalassemia Major.

Statistical analysis:

Data obtained from the studied nurses were organized, revised, coded, and entered using a personal computer. The Statistical Package for Social Sciences (SPSS version 20.0) was used for data analysis. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables and means & standard deviations for quantitative variables. Quantitative continuous data were compared by using a t-test to test significant differences between the mean scores of the studied nurses' knowledge and practices pre-and post-implementation of video-assisted teaching intervention. Pearson correlation analysis was used for assessing the correlation between the studied nurses' knowledge and practices and their characteristics. Chisquare is used to test the study hypotheses. A highly statistical difference was considered at p-value < 0.001, a statistical significant difference was considered at p-value < 0.05, and no statistically significant difference was considered at p-value > 0.05.

Results:

Table (1): Illustrates the nurses' characteristics; it was noticed that the mean age of the studied nurses was 25.8 ± 4.3 years, and more than half (55%) of them graduated from the technical institute of nursing. Also, it was observed that, 55% of them had experience from 3 to less than 6 years.

Figure 1: Clarifies that the majority (93%) of the studied nurses were females, while only 7% of them were males.

Figure 2. Shows that more than two thirds (70%) of the studied nurses didn't attend training courses regarding pediatric blood transfusion-dependent β -thalassemia major.

Table 2. Portrays that, 46% of the studied children were aged between 6 to less than 12 years, with a mean age of 8.36 ± 3.78 years, while 54% of them were females. It also, illustrates that 46% of studied children were in primary school. Regarding the duration of illness, 30% of the studied children were diagnosed as β -thalassemia major children for less than 5 years, with a mean duration of 9 ± 4.56 years. Also, 60% of the studied children were receiving blood more than 6 times per year.

Table 3. Illustrates that the studied nurses had the high mean scores of knowledge regarding pediatric β -thalassemia major and blood transfusion post-video-assisted teaching intervention compared to video-assisted teaching intervention as regards definition, causes, clinical manifestations, diagnostic evaluation, management, and instruction given to children and their parents, complications of β -thalassemia major, precautions of blood transfusion and hazards associated with blood transfusion with a high statistical significance difference between pre/post phases of the video-assisted teaching intervention at $P < 0.05$.

Figure 3. Portrays the percentage distribution of the studied nurses' total knowledge regarding pediatric transfusion-dependent β -thalassemia major and blood transfusion pre and post-video-assisted teaching intervention. It was found that 62% of the studied nurses had an unsatisfactory level of knowledge of pre-video-assisted teaching, while 90% of them had a satisfactory level of knowledge of post-video-assisted teaching intervention.

Table 4. Shows that, the studied nurses had the high mean scores of practices regarding pediatric transfusion-dependent β -thalassemia major post-video-assisted teaching intervention compared to pre-video-assisted teaching intervention as regards measuring vital signs, preparation for blood transfusion, during blood transfusion, after blood transfusion, administration of iron IV chelation therapy with a statistical significance difference between pre/post phases of video-assisted teaching intervention at $P < 0.05$.

Figure 4. Shows nurses' total practices regarding pediatric transfusion-dependent β -thalassemia major and blood transfusion pre- and post-video-assisted teaching intervention and indicated that the majority (82%) of the studied nurses had an incompetent level of practices pre-video- assisted teaching intervention while the majority (90%) of them had a competent level of practices post-video-assisted teaching intervention.

Table 5. Shows that, there was a positive statistically significant correlation between total

scores of nurses' knowledge and their total practices' scores regarding pediatric transfusion-dependent β -thalassemia major and blood transfusion pre/post- video-assisted teaching intervention at $P < 0.05$.

Tables 6 illustrates that there was a significant statistical correlation between the total knowledge and practice of the studied nurses and their characteristics (age, academic qualification, years of experience & previous training) pre and post video-assisted teaching intervention ($P < 0.05$).

Table 1: Frequency and percentage distribution of the studied nurses according to their demographic characteristics (n=60)

| Items | No. | % |
|----------------------------------|----------------|------|
| Age/ Year | | |
| - < 20 | 15 | 25 |
| - 20 < 30 | 33 | 55 |
| - 30 \geq 40 | 12 | 20 |
| M \pm SD | 25.8 \pm 4.3 | |
| academic qualifications | | |
| - Diploma in nursing | 10 | 16.5 |
| - Technical institute in nursing | 33 | 55 |
| - Bachelor in nursing science | 17 | 28.5 |
| Years of experience | | |
| - < 3 | 20 | 33 |
| - 3 < 6 | 27 | 45.4 |
| - \geq 6 | 13 | 21.6 |
| M \pm SD | 3.76 \pm 1.9 | |

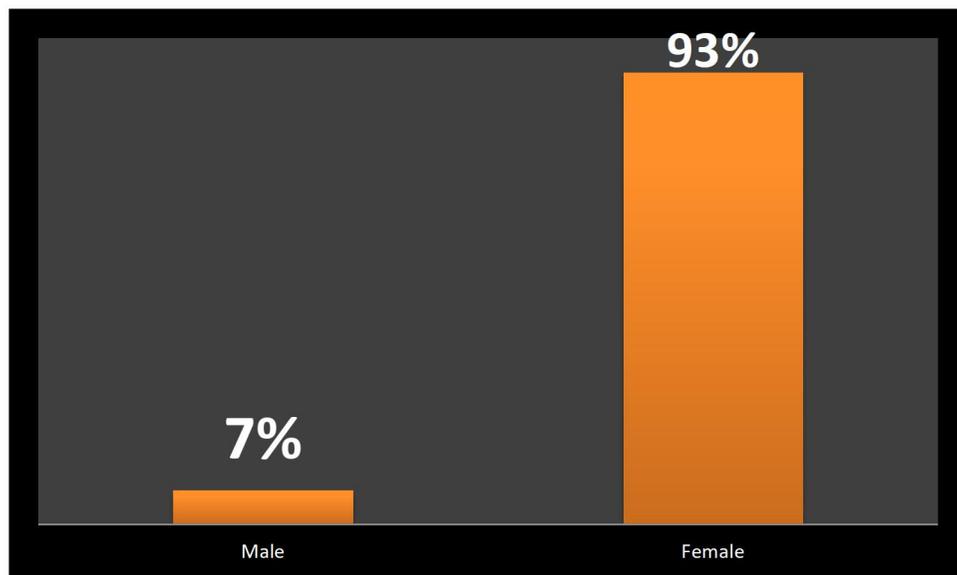


Figure (1): Percentage distribution of the studied nurses according to their gender (n=60)

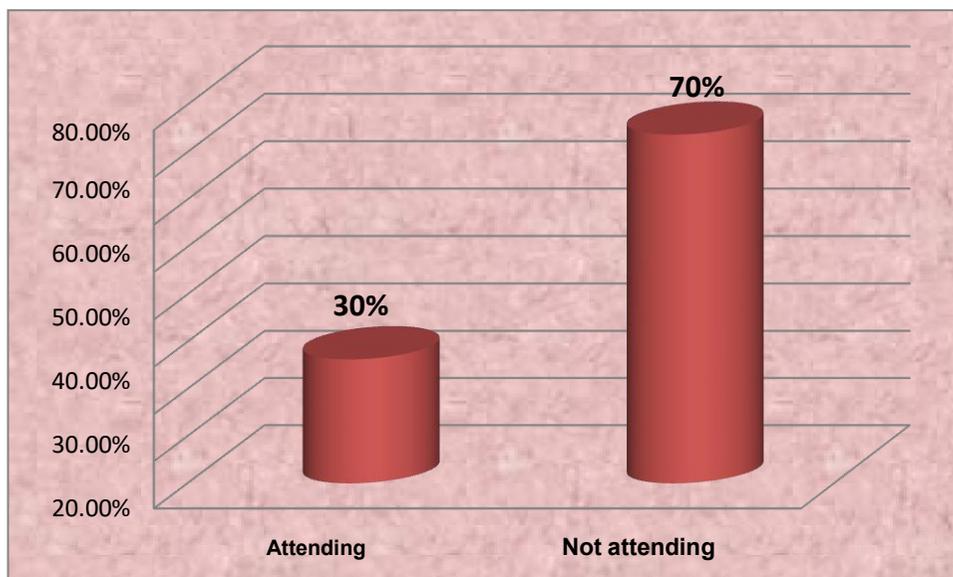


Figure 2: Percentage distribution of the studied nurses according to their attendance to training courses regarding pediatric blood transfusion-dependent β -thalassemia major (n=60).

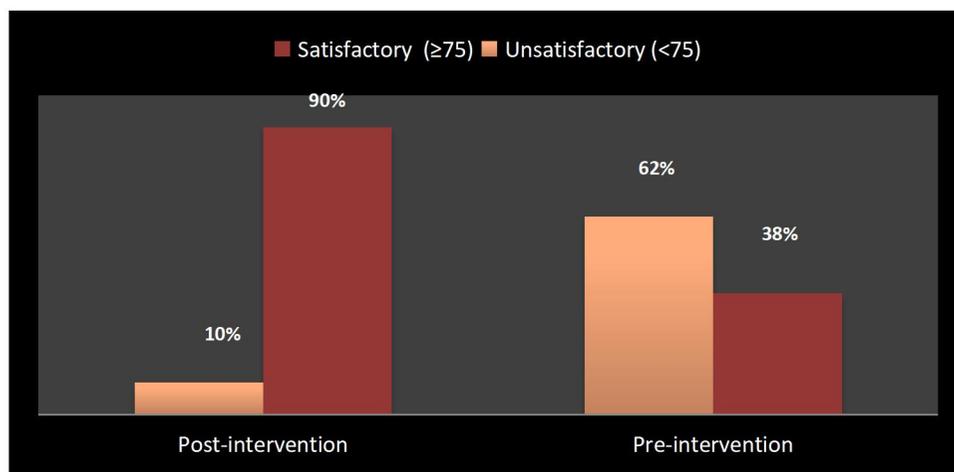
Table 2: Percentage distribution of the studied children according to their demographic characteristics (n=50)

| Items | No. | % |
|--|-----|-------------------|
| Age/ Year | | |
| - < 6 | 16 | 32 |
| - 6 < 12 | 23 | 46 |
| - 12 ≤ 18 | 11 | 22 |
| M± SD | | 8.36 ±3.78 |
| Gender | | |
| - Male | 23 | 46 |
| - Female | 27 | 54 |
| Educational level | | |
| - Not yet enrolled | 17 | 34 |
| - Primary school | 23 | 46 |
| - Preparatory school | 7 | 14 |
| - Secondary school | 3 | 6 |
| Duration of illness per year | | |
| - < 5 | 15 | 30 |
| - 5 < 10 | 11 | 22 |
| - 10 < 15 | 13 | 26 |
| - ≥ 15 | 11 | 22 |
| M± SD | | 9 ±4.56 |
| Frequency of blood transfusion per year | | |
| - ≤ 6 times | 20 | 40 |
| - > 6 times | 30 | 60 |

Table 3: Mean scores of the studied nurses' knowledge regarding pediatric transfusion-dependent β -thalassemia major and blood transfusion pre/post-video-assisted teaching intervention (n=60)

| Item | Pre video-assisted teaching intervention Mean \pm SD | Post-video-assisted teaching intervention Mean \pm SD | Significance | |
|--|---|--|--------------|---------|
| | | | t | P-value |
| Definition of β -thalassemia major | 2.69 \pm 1.13 | 4.87 \pm 1.23 | 10.676 | .005** |
| Causes of β -thalassemia major | 3.65 \pm 2.34 | 6.08 \pm 2.05 | 12.257 | .001** |
| Clinical manifestations of β -thalassemia major | 6.37 \pm 2.48 | 12.54 \pm 4.16 | 13.486 | .000** |
| Diagnostic evaluation of β -thalassemia major | 7.07 \pm 3.69 | 13.05 \pm 3.64 | 11.913 | .001** |
| Management and instruction are given to children and their parents | 2.00 \pm 0.93 | 3.24 \pm 1.03 | 6.552 | .015* |
| Complications of β -thalassemia major | 1.56 \pm 0.48 | 2.44 \pm 0.63 | 6.453 | .021* |
| Precautions of blood transfusion | 1.39 \pm 0.54 | 2.65 \pm 0.82 | 9.323 | .009** |
| Hazards associated with blood transfusion | 1.43 \pm 0.72 | 2.37 \pm 0.76 | 11.323 | .003** |

*P-value<0.05 statistically significant

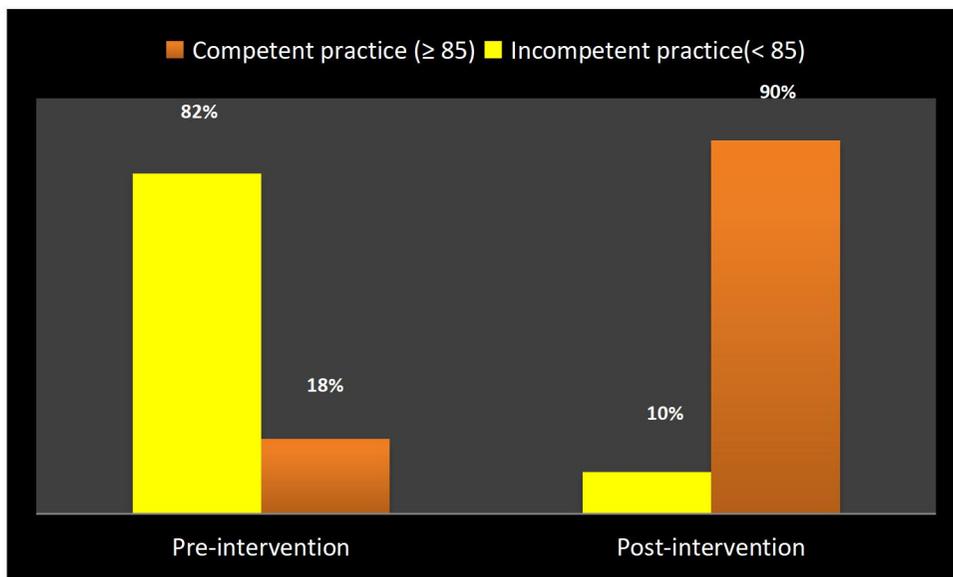


$\chi^2= 37.393$ P value= P<0.05* *A statistically significant at P value P<0.05.

Figure 3: Percentage distribution of the studied nurses' total knowledge regarding pediatric transfusion-dependent β -thalassemia major and blood transfusion pre-and post-video-assisted teaching intervention (n=60).**Table 4:** Mean scores of the studied nurses' practices regarding pediatric transfusion-dependent β -thalassemia and blood transfusion pre/post- video-assisted teaching intervention (n=60)

| Nurses' practice | Pre Mean \pm SD | Post-Mean \pm SD | Significance | |
|--|-------------------|--------------------|--------------|---------|
| | | | t | P-value |
| Measuring vital signs | 5.24 \pm 3.03 | 9.56 \pm 2.19 | 13.603 | .001** |
| Preparation for blood transfusion | 2.88 \pm 1.92 | 4.72 \pm 2.13 | 9.016 | .005** |
| During blood transfusion | 3.06 \pm 1.42 | 7.98 \pm 1.12 | 10.203 | .003** |
| After blood transfusion | 7.58 \pm 3.37 | 9.52 \pm 4.36 | 8.312 | .011* |
| Administration of iron IV chelationtherapy | 6.98 \pm 4.17 | 11.65 \pm 3.82 | 12.242 | .001** |

P-value<0.05 ** highly statistically significant



$\chi^2= 45.345$ P value=0.000** **Highly statistically significant at P value <0.001.

Figure 4: Percentage distribution of the studied nurses' total practice regarding pediatric transfusion-dependent β -thalassemia major and blood transfusion pre and post-video-assisted teaching intervention (n=60).

Table 5: Correlation between studied nurses' total mean scores of knowledge and practices regarding pediatric transfusion-dependent β -thalassemia major and blood transfusion pre/post- video-assisted teaching intervention (n=60)

| Items | Total mean scores of knowledge | | | |
|------------------------------------|---|---------|--|---------|
| | Pre video-assisted teaching intervention (n=60) | | Post video-assisted teaching intervention (n=60) | |
| | r | P-value | R | P-value |
| Total mean scores of practice pre | 0.293 | 0.05* | | |
| Total mean scores of practice post | | | 0.432 | 0.001* |

* P-value <0.05----- statistically significance

Table 6: Correlation between studied nurses' knowledge and practices regarding pediatric transfusion-dependent β -thalassemia major and blood transfusion post- video-assisted teaching intervention and their demographic characteristics (n=60)

| Nurses' demographic characteristics | Nurses' knowledge | | Nurses' practice | |
|-------------------------------------|-------------------|---------|------------------|---------|
| | r | P-value | R | P-value |
| Age | 0.565 | 0.012* | 0.614 | 0.011* |
| Academic qualification | 0.416 | 0.001* | 0.542 | 0.014* |
| Years of experience | 0.413 | 0.013* | 0.645 | 0.015* |
| Previous training | 0.527 | 0.001* | 0.523 | 0.001* |

* P-value <0.05----- statistically significance

Discussion:

B-thalassemia major is severe anemia caused by one of the most frequent recessive genetic illnesses. As a result, children with -thalassemia major require regular blood transfusions to survive. Pediatric nurses are crucial when it comes to blood transfusions for children with -thalassemia. As a result, nurses must have sufficient knowledge and abilities to

secure and preserve the safety of children (**Abd Elhy and Kasemy, 2017**). Because video technology has special properties that accurately reflect the nature of the nursing phenomenon, it is becoming more popular. Furthermore, video technology is widely employed in nursing as a teaching tool since it delivers continuous multi-media, multisensory information about the issue and its context (**Balasubramanian et al., 2018**). Hence, this

study aimed to evaluate the effect of a video-assisted teaching intervention on nurses' knowledge and practice regarding Pediatric Transfusion-Dependent β -Thalassemia Major.

Concerning the demographic characteristics of the studied nurses, the study results revealed that more than half of the studied nurses were aged between 20 to less than 30 years with a mean age of 25.8 ± 4.3 years. This conclusion could be attributed to the hospital's annual hiring of new staff from newly graduated nurses. These findings are similar to those of **Kafil and El-Shahat (2020)**, who evaluated the effect of an educational program on nursing care practices regarding pediatric transfusion-dependent-thalassemia major" and discovered that more than two-fifths of nurses were 24.95.1 years old. These findings differed from those of **Elewa and Elkhattan, (2017)** who evaluated the effect of an educational program on improving quality of nursing care of patients with thalassemia major as regards blood transfusion". They discovered that over half of the nurses tested were between the ages of 30 and 40, with less than five years of experience. While three-quarters of them had a nursing degree, they had never been taught about thalassemia or blood transfusions.

Regarding the nurses' academic qualifications, it was found that more than half of them graduated from technical institutions of nursing, with years of experience ranging from 3 to fewer than 6 years. This outcome could be related to the fact that the technical institute of nursing supplies a big number of nurses to the community. This conclusion is most likely owing to the young age of the nurses that were studied. Nurses' performance is negatively affected as their years of experience decrease, especially when it comes to providing care for children with thalassemia. From the researchers' point of view; young age nurses currently experience a stressful transition into the workforce; so that, the perceptions and needs of young nurses must be considered to ensure effective succession planning. These results are supported by **Kafil and El-Shahat, (2020)** who reported the same results

The study's findings revealed that the children studied had an average age of 8.36.78

years, that more than half of them were females, that more than two-fifths of them were enrolled in primary schools, that about one-third of them had been sick for less than five years, and that less than two-thirds of them had received blood transfusions more than six times per year. This is in line with the findings of **Abu Samra et al., (2015)**, who looked into the "Impact of Educational Programs Regarding Chelation Therapy on the Quality of Life for β -thalassemia Major Children" and discovered that approximately two-thirds of the children studied were aged 8 to less than 12 years, with more than half of them being girls in primary school. They also discovered that 32.9 percent had the condition for 12–15 years and that two-thirds of them needed blood twice a month and were in primary school. They also found that 32.9% of them had the disease for about 12–15 years and two-thirds of them received blood twice per month.

Regarding studied nurses' knowledge about pediatric transfusion-dependent β -thalassemia major, the study results showed a highly statistically significant improvement in nurses' knowledge regarding all items of β -thalassemia major and blood transfusion post-video-assisted teaching intervention compared to video-assisted teaching intervention, with a high statistical significance difference between pre/post phases of the video-assisted teaching intervention at $P < 0.05$. These findings matched those of **Abolwafa et al., (2019)**, who investigated Improving Quality of Nursing Care among School-Aged Children with Thalassemia Major in the Area of Blood Transfusion. Following the execution of the educational program, they discovered a considerable improvement in all items of knowledge among the nurses evaluated. According to **Khoury et al., (2011)**, education can help nurses become more effective as direct care providers. These findings could be related to the nurses' lack of ongoing training and education, as well as a lack of knowledge and nursing care norms.

This finding is also consistent with **Kaur and Charan, (2018)**, who conducted a study, entitled "Effectiveness of structured teaching program on knowledge and practice regarding arterial blood gases among intensive care unit nurses" and discovered that the majority of

nurses had adequate knowledge and practice regarding arterial blood puncture following the implementation of the program-based learning.

In a similar line, **Manju and Prasad, (2019)** conducted a comparative study to evaluate the effectiveness of video-assisted versus lecture cum demonstration method of teaching on bag technique among second-year BSc nursing students in a selected nursing colleague at Mangalore and concluded that video-assisted teaching module was a more effective method for nurses' education.

Results of the current study highlighted that about two-thirds of the studied nurses had an unsatisfactory level of knowledge of pre-video-assisted teaching, while the majority of them had a satisfactory level of knowledge post-video-assisted teaching intervention. From the researchers' point of view, this reflected the positive effect of using video-assisted structured teaching programs in improving knowledge among the studied nurses.

Concerning studied nurses' practices regarding pediatric transfusion-dependent β -thalassemia major, the study results illustrated a highly significant improvement in high mean scores of the studied nurses' practices (prior, during & after blood transfusion, vital signs measurements, and IV iron chelation therapy) post-video-assisted teaching intervention compared to pre-video-assisted teaching intervention. From the researchers' point of view, these findings could result from a shortage of both qualified nurses and training programs which, emphasizes the importance of on job training in improving nurses' performance. These results are parallel with the study published by **Abolwafa et al., (2019)** in their study about the Quality of Nursing Care among School-Age Children with Thalassemia as regards Blood Transfusion and Self-Concept. They found a statistically significant improvement in the studied nurses' practices after program implementation.

Furthermore, a study conducted by **Khalaf et al., (2017)** entitled "Effect of Training Program on Nurses' Competent Practices Towards Children Receiving Blood Transfusion" found that studied nurses demonstrated very low levels of competence in caring for children receiving a blood

transfusion before the educational program was implemented, but that this improved after the program was implemented.

According to **Hijji et al., (2018)**, who conducted a study investigated nurses' practice of blood transfusion in the United Arab Emirates," and stated that poor blood transfusion practice among nurses is one of the leading causes of morbidity and mortality among patients who get a blood transfusion. As a result, a blood transfusion policy is required, as well as training and instruction regarding these practical standards through an educational program.

The study results indicated that the majority of the studied nurses had an incompetent level of practice pre-video-assisted video-assisted teaching intervention while more than four-fifths of them had a competent level of practice post-video-assisted teaching intervention. From the researchers' point of view, this reflected the positive effect of using video-assisted structured teaching programs in improving practice among the studied nurses that led to proper care for children with β -thalassemia major and blood transfusion.

The current study found a significantly significant positive association between the total knowledge and practices of the nurses investigated before and after the video-assisted training intervention in pediatric transfusion-dependent -thalassemia major. These findings were comparable to those of **Elewa and Elkhattan (2017)**, who discovered a statistically significant link between nurses' knowledge and practice in the pre-and post-program implementation stages. These findings highlight the fact that information influences practice, and that without correct, sufficient knowledge, nurses' practices will become more dangerous and inefficient. Furthermore, **Vaghar, (2018)** who conducted a study about "The Impact of an Educational Program on Blood and Blood Products Transfusion on Nurses' Level of Knowledge and Performance" reported that training and education are essential for all staff nurses involved in the transfusion procedure as it minimizes transfusion errors. *From the researchers' point of view*, this association is explained by that improvement in knowledge is reflected in the

improvement practice. Also, mean when the studied nurses had sufficient knowledge they can practice well. Also, this reflected the success of the video-assisted teaching intervention and its positive effect.

As the researchers provided videos to the nurses' e-mail, this might be ascribed to the nurses having more time for blood transfusion education, which could help them improve their knowledge and ability to operate efficiently. This discovery could be attributed to scientific and technical advancements, as video-assisted instructional intervention causes professional abilities to become obsolete in a short amount of time. As a result, for nurses to practice, a comprehensive fundamental professional education is no longer sufficient. This finding was corroborated by **Kaur and Charan (2018)**, who found that in the post-test phase, the majority of the nurses evaluated had a high level of practice. Nursing education should be updated and efficient in light of the constant advancement of training methodologies. This finding was on the same line with the study done by **Safwat and Khorais (2018)** who revealed that there was a significant positive correlation between nurses' knowledge and practices at the post-program phases ($P < 0.001$).

Finally, the current study revealed a highly statistically significant correlation between studied nurses' knowledge and practices regarding pediatric transfusion-dependent β -thalassemia major post- video-assisted teaching intervention and their demographic characteristics (age, educational level, years of experience, and previous training). These results are supported by **Abed El-Hay et al., (2018)** who studied the Effect of Educational Guidelines on Nurses' Performance Regarding Management of Patients Undergoing Bone Marrow Transplantation and found a statistically significant positive correlation among nurses' knowledge and practice and their socio-demographic characteristics. These results could be attributed to the positive relationship between the level of education and both nurses' knowledge and nursing practice as being stated by **Deborah and Corcoran (2011)**. In addition, **Shafik and AbdAllah (2015)** reported that the greater the years of experience of the nurses, the greater their knowledge and practices.

Conclusion:

Based on the results of the current study, it can be concluded that there were statistically significant improvements in nurses' knowledge and practices regarding pediatric transfusion-dependent β -thalassemia major post-video-assisted teaching intervention than pre-intervention which reflected that the video-assisted teaching intervention is an effective teaching method. Also, there was a statistically significant correlation between studied nurses' demographic characteristics and their total knowledge and practices scores post-video-assisted teaching intervention.

Recommendations:

Based on the results of the current study, the following recommendations can be suggested:

- The study recommended that, using the video-assisted teaching intervention for nurses caring for children with transfusion-dependent β -thalassemia major to promote and improve their knowledge and ensure competent practice.
- Development of a training program should be conducted periodically with various teaching methods for nursing staff to improve their knowledge and practice regarding blood transfusion and pediatric B- thalassemia major.
- Guidelines should be organized and available for the nurses in the Arabic language to guide them in dealing with children with transfusion-dependent β -thalassemia major.
- Replication of the current study with a larger sample of nurses in different settings is required for generalizing the results.

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