

## Effect of an Illustrated Educational Guide on Anxiety Level among Parents of Children Undergoing Cardiac Catheterization

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### **Abstract**

*Cardiac catheterization is a stressful and anxiety induced experience for parents of children prior to cardiac catheterization. Thus, the responsibilities of a catheterization lab nurse begin with the assessment of parental anxiety as a part of pre-procedure preparation of parents. There is an evidence that information offered by CCL pediatric nurses pre-procedure reduces parental anxiety. Information can be provided by a variety of methods. In this study, it was provided by a printed material such as illustrated educational guide. **Objective:** The aims of the study are to develop an illustrated educational guide about pediatric cardiac catheterization and evaluate its effectiveness on anxiety level in parents of children undergoing cardiac catheterization. **Setting:** This study was conducted at Cardiac Catheterization Lab, Makassed General Hospital (MGH) Beirut, Lebanon. **Subjects:** It comprised of a convenience sample of 100 parents (father or mother). Parents were randomly allocated into two groups. The control group was educated by using conventional verbal information method while, the study group was educated by both verbal and use the illustrated educational guide about pediatric cardiac catheterization. **Tools:** Two tools were used for data collection; Beck Anxiety Inventory (BAI) and the Illustrated educational Guide about Pediatric Cardiac Catheterization. **Results:** During pre-orientation phase, It was found that the highest percent of parents (74% in the study group and 68% in the control group) experiencing moderate anxiety before giving information either by using the informative guide about cardiac catheterization or verbally. Whereas, during post orientation phase, it was obviously noticed that the majority of parents (90%) in the study group exhibit low anxiety level after receiving information about cardiac catheterization using illustrated educational guide, compared to 40% of parents in the control group who received the information verbally. **Conclusion:** The results of the study denote using of a developed illustrated educational guide about pediatric cardiac catheterization was effective in reduction of anxiety level among parents. **Recommendations:** Cardiac catheterization nurses should develop an illustrated educational guide about cardiac catheterization to be used as a reference for orientation pre- cardiac catheterization procedure and disseminated to parents before discharge.*

**Keywords:** Pediatric cardiac catheterization; Parent anxiety; Educational guide.

### **Introduction**

Congenital Heart Disease (CHD) is the most well-known inborn anomaly in newborns. Likewise, it is a main etiology of death in the first year of life. It has been defined as the presence of structural abnormality in the heart or great blood vessels during intrauterine life. The exact cause of CHD is obscured nevertheless

rapid and recent advances thought that it is due to multifactor as complex interaction of genetic and environmental influences<sup>(1,2)</sup>. Congenital Heart Diseases are commonly found in the pediatric age group from 0 to 15 years<sup>(3)</sup>. Congenital heart defects may be classified into cyanotic and a-cyanotic depending upon whether the patients clinically exhibit cyanosis<sup>(4)</sup>.

Congenital Heart Disease can affect any child, regardless of nationality or socio-economic background. Worldwide, it accounts for 8-12/1000 live births and approximately 30% to 40% of all congenital defects<sup>(5)</sup>. Annually, in Lebanon alone 1 in 100 babies is born with Congenital Heart Disease. More than 700 babies are diagnosed with heart disease every year<sup>(6)</sup>. While in Alexandria (Egypt), it was found the prevalence of congenital heart diseases (CHD) among school children accounted for 1.01/1000 child<sup>(7)</sup>. In United States, the incidence of CHD ranges between 4-10/1000 live births<sup>(8)</sup>. Currently, with great advancements in prenatal diagnosis and corrective strategies, the number of infantile deaths has declined, and more than 3/4 of children with congenital malformations survive into adulthood<sup>(9)</sup>.

A variety of invasive and non-invasive techniques may be implemented in diagnosis of congenital heart diseases among children. Pediatric cardiac catheterization is the most invasive diagnostic procedure which is usually required prior to therapeutic intervention. In the last two decades, remarkable medical progresses allow congenital heart defects to be treated in the catheterization lab without surgery. Pediatric cardiac catheterization is a sterile procedure performed using a radiopaque catheter that is inserted through a peripheral blood vessels into the heart. It is usually combined with angiocardiology in which a radiopaque contrast material is injected through the catheter and into the circulation. Pediatric cardiac catheterization provides information regarding oxygen saturation of blood within heart chambers and great vessels, cardiac output or stroke volume as well as anatomic abnormalities such as septal defects or obstruction<sup>(10-12)</sup>.

Pediatric cardiac catheterization may be performed for diagnostic, interventional correction or for electrophysiological purpose. Diagnostic cardiac catheterization includes two techniques as right sided or venous catheterization and left sided or arterial catheterization. Whereas the

interventional cardiac catheterization is the use of a catheter to treat heart disease such as the use of balloon catheter to dilate narrowed valve or vessels. On the other hand, diagnostic electrophysiological catheterization employs catheter with tiny electrodes that record the heart electrical impulses directly from the conduction system<sup>(12-14)</sup>.

Cardiac catheterization is a stressful and anxiety provoking experience for parents of children during pre-procedure<sup>(10,15)</sup>. Uzgeret et al. (2015) found that cardiac catheterization with angiography was associated with increased levels of depression and anxiety in parents of children undergoing cardiac catheterization<sup>(1)</sup>. Woolf - King et al. (2017) reviewed published data in cardiac, nursing, pediatric and social science journals between 1984 and 2015 in the United States from 10 countries (Australia, Switzerland, Norway, the Netherlands, the United Kingdom, Canada, China, Finland and Italy). The researchers found 25% to 50% of parents of children with critical congenital heart defects reported elevated symptoms of anxiety, depression or both; and 30% to 80% reported experiencing severe psychological distress<sup>(16)</sup>.

Stress and anxiety are fight-and-flight instincts for responding to emergencies. It is a normal, emotional, reasonable and expected response to real or potential danger. Occasional anxiety is a normal part of life. It is a subjective feeling of tension, discomfort, apprehension or fearful concern accompanied by autonomic and somatic manifestations<sup>(17)</sup>. Parental anxiety due to children cardiac catheterization results from numerous reasons such as insufficient information about cardiac catheterization, its procedure, pre-procedure preparation and post procedure management, in addition to the probable complications during or after the procedure as well as follow-up plan of care<sup>(18)</sup>.

Cardiac catheterization lab pediatric nurses play a pivotal role in cardiac care of children. It is well known that the behavior of children is influenced by the mental health of their parents. Certainly, pediatric cardiac catheterization is recognized as anxiety induced procedure for parents. Thus, the responsibilities of a catheterization lab nurse begin with the assessment of parental anxiety as a part of pre-procedure preparation of parents as well as children for cardiac catheterization. When, cardiac catheterization lab pediatric nurses offer pre-procedure information, it reduces parental anxiety. Giving information should be individualized on the basis of their cultural and intellectual background, their previous hospital experience and knowledge<sup>(18-20)</sup>.

Variety of educational materials can be used to increase parental information and awareness about cardiac catheterization procedure. One of these is the written or printed material which can include booklets, leaflets, pamphlets and informational guides<sup>(21,22)</sup>. Printed materials are the most common educational tool used by cardiac catheterization lab pediatric nurses for many reasons. They allow retention for more information and recalling it at any time. They offer message consistency and allow flexibility in the timing and delivery of information. It makes parents able to refer to them when required and to use them to learn at their own pace. They also are simple and easy to carry and interact with as needed without the necessity of further equipment. In addition to its effectiveness in changing knowledge, attitudes and behavior in relation to a wide range of health-related issues<sup>(23-26)</sup>.

In this study, the researchers developed an illustrated educational guide that contains essential and accurate information about cardiac catheterization procedure, pre and post procedure preparation as well as discharge plan. The information was written in a clear, concise, and simple language. It was accompanied by simple illustrations that are clearly

labeled to facilitate comprehension of written information. This guide was developed to equip the parents with the necessary instruction about pediatric cardiac catheterization procedure in a way that increase their awareness and decrease their anxiety regarding it<sup>(27)</sup>.

### ***Aims of the Study***

The aims of the study are to:

- 1- Develop an illustrated educational guide about pediatric cardiac catheterization.
- 2- Evaluate the effectiveness of an illustrated educational guide on anxiety level among parents of children undergoing cardiac catheterization

### **Research Hypothesis:**

Using an illustrated educational guide is more effective than conventional verbal information method in reducing anxiety among parents of children undergoing cardiac catheterization.

### ***Materials and Method***

#### ***Materials***

**Design:** A quasi experimental research design was implemented.

**Setting:** This study was conducted at Cardiac Catheterization Lab, Makassed General Hospital (MGH) Beirut, Lebanon.

**Subjects:** It comprised of a convenience sample of 100 parents (father or mother) with the following criteria:

- 1- Has child with congenital heart disease.
- 2- The child is undergoing cardiac catheterization for the first time.

Parents were randomly allocated into two groups: control and study group.

Orientation about pediatric cardiac catheterization was given to the control group using conventional verbal method while, the study group received the same

information during orientation using illustrated informative guide.

**Exclusion Criteria:**

Any parent has the following problems was excluded:

- With visual or hearing problems.
- With history of psychological disorders or taking antipsychotic medications.

**Tools:** Two tools were used for data collection:

**Tool I: Beck Anxiety Inventory (BAI)**

This tool was developed by Beck<sup>(28)</sup>. It was adopted and translated into Arabic. It is a self-report measure of anxiety. It is composed of 21 items. The total score is calculated by finding the sum of the 21 items. All questions are ranked as follow not at all=0, mildly but it did not bother me much=1, moderately- it was not pleasant at times=2, severely- it bothered me a lot=3. The total score is calculated by finding the sum of the 21 items.

Score of 0 – 9= Minimal anxiety

Score of 10-16= Mild anxiety

Score of 17-29= Moderate anxiety

Score of 30 – 63= Severe anxiety

There are attached data regarding parents' biosocio-demographic characteristics included in this tool such as age, sex, marital status, and level of education.

Besides, children's characteristics include age, gender, birth order, and diagnosis.

**Tool II: The Illustrated educational Guide about Pediatric Cardiac Catheterization**

This illustrated educational guide was developed by the researchers after thorough reviewing of the current and related literature as well as it included the conventional information which was given to all parents from the nursing and medical staff of the Cardiac Catheterization Department in the hospital to guarantee that

all parents in both groups received the same information. It included definition of cardiac catheterization, indications, types, cardiac catheterization lab, pre-procedure preparation of the child, and intervention during cardiac catheterization procedure, post procedure management of the child undergoing cardiac catheterization, discharge plan for the child and finally the probable complications of cardiac catheterization for the child.

**Method**

- An official permission to conduct the study was obtained from the responsible authorities in institutional review board (IRB) of Makassed General Hospital (MGH).
- Tools I was adopted and translated into Arabic. The accuracy of its translation was reviewed and validated by a jury of five expertises in nursing and related field of psychology.
- Development of Tool II “The illustrated educational guide about pediatric cardiac catheterization” (attached booklet)done through three phases which includes:
  - a. Preparation phase:** The researchers achieved it after reviewing the related and current literature about pediatric cardiac catheterization. It was also congruent with the conventional verbal instructions that were given by cardiac catheterization lab staff in the previous mentioned setting. It displays the objectives of the guide, definition of cardiac catheterization, its indications and duration and pre, intra and post procedure interventions as well as discharge instructions:
    - Pre-procedural preparation of the child that includes the following: nothing per mouth (NPO),wearing the apron, taking vital signs and growth measurement, asking about the presence or absence of allergy on iodine, medication or

- food, inserting an intravenous line, signing the informed consent of the parent, and taking the pre-procedural medication.
- Intra-procedure interventions on the cardiac lab environment include lying supine during the procedure, attaching the child to the monitor, taking general anesthesia, the insertion of the catheter, showing the pathway from the artery of the extremity to the coronary arteries, and heart, injection of the dye.
  - Post-procedural interventions as pressing on the insertion site for 20 - 30 minutes, applying a tense plaster around the site, returning to the patient's room, giving the instructions that the patient must keep his affected extremity straight for a period of time, continuous assessment by the nurse of the peripheral circulation, the color and the pulse of that extremity, being able to take fluids post-procedure if the condition permits, and being able to know the result of the procedure.
  - Discharge instructions about cleanliness of insertion site, measures to control bleeding if occurred, manifestations of infection or inflammation in insertion site of the catheter, bathing precautions and play instructions.
  - The content validity of the illustrated educational guide was tested and reviewed by five expertise in the field of nursing and staff in cardiac catheterization lab.
  - Interview was conducted with parents (for both groups) in the child's room at hospital upon admission at least 2 hours before cardiac catheterization.
- During this interview, parents and children demographic data, health related characteristics and anxiety level were assessed using tool I.
- b. Orientation phase / implementation phase: involve the following steps:**
- A pilot study was carried out on a sample of ten parents not included in the study, in order to test the feasibility, clarity, and applicability of the study tools, and accordingly, little modifications were done that include removal of some sophisticated images about intra procedural technique of cardiac catheterization.
  - A convenience sample of parents who have child undergoing cardiac catheterization for the first time were randomly allocated into two groups. Firstly, data was collected from parents in the control group.
  - The orientation about information of pediatric cardiac catheterization was implemented as follow:
  - The information about pediatric cardiac catheterization was delivered verbally by the researcher for parents in the control group (which is the conventional method used in the cardiac catheterization unit)
  - The study group was received the information about pediatric cardiac catheterization by the researcher using both verbal explanations and the illustrated educational guide.
  - Parents in both groups were encouraged to ask for further information for more explanation if needed.
- c. Evaluation phase:** included the following:

- After giving information and while waiting for the child cardiac catheterization to be done, about 30 minutes before the procedure, the anxiety level of parent was assessed again using tool I.
  - Both verbal and using educational guide sessions lasted from 30– 40 minutes.
- Data collection started from March 2016 to August 2016.

#### **Ethical considerations:**

- Informed written consent for voluntary participation in the study was obtained from the recruited patients and their family caregivers after explaining the aim of the study.
- Subjects' privacy and anonymity were assured and respected.
- Data confidentiality was considered and respected.

#### **Statistical Analysis**

- Collected data were coded and transferred into specially designed formats suitable for computer feeding.
- Data entry, checking and verification were carried out. Frequency analysis, cross-tabulation and manual revision were all used to detect any errors.
- The Statistical Package for Social Sciences (SPSS) program, version 20.0 was utilized for both data presentation and statistical analysis of the results.
- The following statistical measures were used:
  - A. For descriptive presentations frequency, percentage, minimum, maximum, arithmetic mean, and standard deviation were used.
  - B. Fisher's Exact Test (FET) was used to test the association

between variables when expected frequency  $>5$  exceeding 20% of cells.

- Levels of significance selected for this study were  $p$  equal to or less than 0.05 and 0.001.

#### **Results**

It is noticed in **table (1)** that the highest percentage of children aged from two to 4 years in both the study and control group. The male gender constitutes nearly the two third of the children in both groups (64% in study group and 68% in the control one). The first child represents the highest percent in the study as well as in the control group (76% and 80% respectively). The majority of children have a-cyanotic congenital heart diseases (94% in the study group and 90% in the control one).

**Table (2)** shows the biosocio-demographic characteristics of the parents. Regarding the age, the highest percent of parents were aged from 30 to less than 40 years in both the study and the control groups (48% and 46% respectively). The parents aged less than 25 years were the least in both the study and the control groups 4% and 10% respectively.

Concerning the gender of the parents, nearly half of the parents in both the study group and the control group were fathers with 52% and 54% respectively.

With respect to the marital status, most of the parents in the study group (94%) and the control groups (88%) were married.

Referring to the level of education, the highest percentage of parents in the study group (42%) had intermediate education and the least represented parents (10%) in the same group had elementary education. On the other hand, the highest percentage of the parents (38%) in the control group had secondary education and the least represented parents (8%) in the same group had university degree.

No statistical significant differences were observed between the two groups in

relation to their age, gender, marital status, and educational level.

**Table (3)** shows that all parents in both groups exhibit anxiety before giving information about pediatric cardiac catheterization but in different level in which 29% of them experience mild anxiety while the majority of parents (71%) have moderate anxiety level.

**Table (4)** illustrates comparison between two groups during pre and post orientation of giving information regarding their level of anxiety. During pre-orientation phase, It was found that the highest percent of parents (74% in the study group and 68% in the control group) experiencing moderate anxiety before giving information either by using the informative guide about cardiac catheterization or verbally. There is no statistical significant difference between two groups.

Whereas, during post orientation phase, it is obviously noticed that the majority of parents (90%) in the study group exhibit mild anxiety level after receiving information about cardiac catheterization using illustrated educational guide, compared to 40% of parents in the control group who received the information verbally. There was statistical significant difference between both groups post orientation phase.

**Table (5)** represents that in the control group, there are more than two thirds of parents have moderate anxiety before receiving verbal orientation about cardiac catheterization whereas, their percentage are reduced to 60% after gaining information verbally. The mean score of BAI among parents was  $28.1000 \pm 8.14724$  which is declined to  $23.9400 \pm 7.45164$  after verbal orientation. So there is an evident statistical significant difference ( $P=0.022$ ).

**Table (6)** presents the comparison between the levels of anxiety among parents during pre and post using the informative guide. It was found that nearly three quarter of the parents experiencing moderate

anxiety before using the educational guide about cardiac catheterization compared to the majority of them exhibit mild degree of anxiety after using the informative guide. The mean score of BAI among parents was  $26.1800 \pm 6.2227$  before using the informative guide which is decreased to  $23.9400 \pm 7.45164$  after using it with statistical significant difference at  $P=0.00$ .

**Table (7)** shows during pre-orientation phase in the study group, about two thirds of parents (68%) who have children with a-cyanotic congenital heart disease exhibit moderate anxiety level. Whereas, after using the illustrated informative guide during orientation, the majority of parents (90%) who have children with the same diagnosis experience low anxiety. There was a statistical significant difference.

It is noticed in **table (8)** that in the control group during pre-orientation phase, nearly two thirds of parents (66%) who have children with a-cyanotic congenital heart disease exhibit moderate anxiety level. While, after verbal orientation, the percent of parents who have children with the same diagnosis and at the same level of anxiety was reduced to (58%).

## Discussion

Pediatric cardiac catheterization is considered as a stressful and anxiety causing experience for children as well as their parents. The child response to the stress of cardiac catheterization will be influenced by many factors such as parents' anxiety that mainly developed due to lack of parents' information about cardiac catheterization procedure and management of child's disease<sup>(15)</sup>. Subsequently, assessment of parental anxiety is so crucial because it contributes to child stress. Correct information about cardiac catheterization should be individualized on the basis of parents' cultural and intellectual background, their previous experience<sup>(15,19,29)</sup>.

Congenital heart defects are commonly found in the pediatric age group from 0 to 15

years<sup>(3)</sup>. The finding of the current study revealed that the age of the child, in both the study and control group and undergoing cardiac catheterization, ranged from neonatal to preschool age (Table 1). This results parallel with the scientific and practical background that prove that cardiac catheterization can be done to children with congenital heart defects at any age even newborns immediately after birth<sup>(30)</sup>.

Regarding the gender, male children in the present study constitutes approximately two third of the sample in both the study and control group (Table 1). The finding in line with researches done in Egypt such as Atwa Z T and Safar H H (2014), their sample included 171 males and 141 females with CHDs aged less than 12 years<sup>(31)</sup>. Moreover, In Alexandria, Egypt, Abouheiba MGM (2015) found that the occurrence of congenital heart disease in male children was slightly higher than females<sup>(32)</sup>. It could be due to about 15% of congenital heart diseases are related with hereditary conditions<sup>(1,2)</sup>.

Regarding the child's diagnosis, the current results denoted that children with a-cyanotic congenital heart disease represents the majority of children in both the study and control group (table 1). This congruent with Uzger et al. (2015), they found Sixty-one patients (83.6%) had a cyanotic congenital heart disease<sup>(1)</sup>. Additionally, in Alexandria, Egypt, Abou heiba MGM (2015) found that the majority of the sample was diagnosed as a-cyanotic congenital heart disease<sup>(32)</sup>.

Parental participation is integral to the preprocedure preparation process of pediatric cardiac catheterization. Family caregivers have a significant responsibility in the care of their child in intensive care<sup>(33)</sup>. Although, the Biosocio-demographic profile of parents in both groups was statistically insignificant, it was appreciated to find during data collection of the current study that both parents (mother and father) present with the child during performance of cardiac catheterization (Table 2). It could be due to that in Lebanon culture, the

husband and wife share the authority in child rearing and support, parents spend time with children and are more invested in the treatment process; therefore, children's health problems tend to create anxiety and stress in both parents. Although wives usually have more influence over children and in various household matters<sup>(34)</sup>. Contrary to, Shan CH and Hawkins R (2014) finding that mothers were more likely than fathers to be children's fundamental and preferred caregivers<sup>(35)</sup>. It is compatible with Egyptian society that highlight the role of the mother in the family because of carrying out most of household activities including childcare in health and illness<sup>(36)</sup>.

Cardiac catheterization of children is a major reason of anxiety for their parents<sup>(37)</sup>. In the current study, prior to conducting the orientation about pediatric cardiac catheterization either verbally or using the illustrated informative guide, the researcher discovered that all parents in both groups had variable levels of anxiety ranged from mild to moderate as mentioned in table (3). Furthermore, the high percentage of parents in both the study and control group exhibits moderate anxiety level during pre-orientation phase (Table 4). It could be due to lack of knowledge and accurate information as well as misconception about pediatric cardiac catheterization particularly, this is the first time for all children to perform cardiac catheterization as well as first experience of the parents to confront this situation. Lack of awareness about cardiac catheterization procedure, recovery methods and discharge plan and future life lead to elevation of parents' anxiety<sup>(18,38,39)</sup>. This results parallel with Rahimianfar et al. (2015) findings revealed that stress mean was higher than average among mothers of children undergoing cardiac catheterization<sup>(40)</sup>. Besides, Uzger et al. (2015) results shows BAI scores of parents of children undergoing angiography were 21.9% had mild, 11% was moderate, and 17.8% was severe anxiety<sup>(1)</sup>. Unfortunately, in Lebanon, Zahrk (2004) assumed that provision of pre-operative



information on pre and postoperative care is mostly focused on providing procedural information while the psychological needs of children and their parents have rarely been taken into consideration<sup>(41)</sup>.

There is an evidence that the information about the treatment regimen that was offered by nurses at an early stage pre procedure will reduce anxiety<sup>(18,42-44)</sup>. In the current study, it was amazing that after orientation using the illustrated educational guide about pediatric cardiac catheterization, it was found that the majority of parents exhibits reduction of anxiety level from moderate to mild level (Table 4 and 6). It could be due to using of simple and clear information about pediatric cardiac catheterization that increased parent's awareness and leads to decrease their anxiety as well as simple illustration about pre, and post procedure care of the child. This result was supported by Valizadeh et al. (2016), they concluded that using a booklet and film are saving the time, cost, and staffing moreover, sending quick message to large number of people as well as the use of audio-visual equipment helps for better understanding of unfamiliar concepts, when the words unable to express the concepts<sup>(45)</sup>. The results also was congruent with Naylor, Coates, and Kan., they found that using of manuals with coloring books to explain the cardiac catheterization procedure showed less anxiety of parents<sup>(46)</sup>. Furthermore, booklets with color pictures and simple language written could be effective methods of orientation for people with low education. As a result, it could improve the process of communication with staff and increase their participation in the care<sup>(47)</sup>. Contrary, Ayasrah, and Ahmad (2016), Ruffinengo, Versino, and Renga (2009) proved that informative video about pediatric cardiac catheterization leads to reduction of pre-procedural anxiety levels among parents<sup>(48,49)</sup>.

Preprocedure information about cardiac catheterization can be provided by a variety of tools, including printed materials

or verbal orientation. All tools reduced patients and parents' anxiety<sup>(50)</sup>. It was noticed in the study group of the current study, that the percentage of parents who have reduction from moderate to mild anxiety was increased after orientation (Table 4, 5 and 6). It may be due to that using of illustrated educational guide and verbal orientation are collaborated and integrated with each other to achieve its effect on reducing parental anxiety. While, verbal orientation must be convinced with another educational method. It is congruent with Reberte et al. (2012) who reported that the use of educational booklet in health care is a public practice in the world health system. Furthermore, manuals for health care, guidelines, information leaflets and booklets are able to promote outcomes for educational activities<sup>(51)</sup>. As well Mullin (2015) documented that parent of children undergoing cardiac catheterization sent a home with written instruction<sup>(52)</sup>. Likewise, Kunst, Groot, Lathe, et al. (2002) concluded that the majority of pediatric hospitals that provide surgery and distinctive procedures provide printed material to families. Written materials can be adult or child-directed and are generally enhanced by visual images or diagrams<sup>(53)</sup>.

The present study illustrates that the majority of parents of children who having a-cyanotic congenital heart disease experience anxiety but in variable level ranged between mild to moderate anxiety more than cyanotic one (table 7, 8). It could be due to small number of children who have cyanotic congenital heart defect. This results is not in line with Uzgaret et al. (2015) who concluded that mothers of patients with cyanotic congenital heart disease had significantly higher levels of depression and anxiety<sup>(1)</sup>.

### **Conclusion**

Based on the results of the current study, it can be concluded that using the developed illustrated educational guide about pediatric cardiac catheterization was effective in reducing the anxiety level among parents. As it leads to raising the

parents' awareness about cardiac catheterization procedure, pre-procedure, intra and post-procedure intervention, discharge activities as well as possible complications and feasible management at home. Additionally, there are declining in the level of anxiety when parents received the information verbally.

### ***Recommendations***

*Based on the previous results, the following can be recommended:*

- Cardiac catheterization nurses should develop and use an illustrated educational guide about pediatric

cardiac catheterization as a vital part of pre-procedure psychological preparation in order to reduce parental anxiety. Moreover, the educational guide can be used as a reference and disseminate it to parents before discharge.

- Conducive environment can be created in pediatric cardiac catheterization by application of verbal orientation in combining with illustrated educational guide during the orientation phase pre-procedure.

**Table (1): Percent distribution of children's characteristics**

Child characteristics	Study group		Control group	
	No(50)	%	No(50)	%
<b>Age:</b>				
<2 years	15	30%	10	20%
2- 4 years	24	48%	26	52%
More than 4 years	11	22%	14	28%
<b>Gender:</b>				
Male	32	64%	34	68%
Female	18	36%	16	32%
<b>Birth order:</b>				
First	38	76%	40	80%
Second	12	24%	10	20%
<b>Diagnosis:</b>				
A-cyanotic congenital heart disease	47	94%	45	90%
Cyanotic congenital heart disease	3	6%	5	10%

**Table (2): The biosocio-demographic characteristics of parents**

<b>Parents' Characteristics</b>	<b>Study group (n=50)</b>		<b>Control group (n=50)</b>		<b>X<sup>2</sup></b>	<b>P</b>
<b>Age/ years</b>						
Less than 25	2	4%	5	10%	9.72	0.62
25 and < 30	19	38%	15	30%		
30 and < 40	24	48%	23	46%		
40 and above	5	10%	7	14%		
<b>Type of parents:</b>						
Father	26	52%	27	54%	0.04	0.84
Mother	24	48%	23	46%		
<b>Marital Status:</b>						
Married	47	94%	44	88%	9.09	0.49
Unmarried (divorced or widow)	3	6%	6	12%		
<b>Level of education:</b>						
Elementary	5	10%	11	22%	3.35	0.34
Intermediate (preparatory)	21	42%	16	32%		
Secondary	18	36%	19	38%		
University	6	12%	4	8%		

Significant at P&lt;0.05

**Table (3): Percent distribution of all parents in both groups regarding their anxiety level before giving information about pediatric cardiac catheterization**

Anxiety level	All parents in both groups	
	No (100)	%
Mild anxiety	29	29%
Moderate anxiety	71	71%

**Table (4): Level of anxiety among parents in both groups during pre-and post-orientation phase**

Level of anxiety	Pre-orientation phase				Post-orientation phase			
	Study group		Control group		Study group		Control group	
	No (50)	%	No (50)	%	No (50)	%	No (50)	%
Mild anxiety	13	26%	16	32%	45	90%	20	40%
Moderate anxiety	37	74%	34	68%	5	10%	30	60%
$X^2 = .437$ $P = .509$					$X^2 = 27.473$ $P = .000^*$			

Spearman chi square test  $X^2$

significant at  $p < 0.05$

**Table (5): Level of anxiety among parents in the control group during pre and post giving verbal information about cardiac catheterization**

Level of anxiety	Control group				
	Before verbal orientation		After verbal orientation		
	No (50)	%	No (50)	%	
Mild anxiety	16	32%	20	40%	
Moderate anxiety	34	68%	30	60%	
<b>Mean</b>	28.1000		23.9400		$t = 3.238$ $P = .022^*$
<b>SD</b>	8.14724		7.45164		

$t =$  Paired t test

Significant at  $P < 0.05$

**Table (6): Level of anxiety among parents in the study group during pre and post using the educational guide**

Level of anxiety	Study group				
	Before using educational guide		After using educational guide		
	No (50)	%	No (50)	%	
Mild anxiety	13	26%	45	90%	
Moderate anxiety	37	74%	5	10%	
<b>Mean</b>	26.1800		19.0000		t= 6.696 P= 0.00*
<b>SD</b>	6.2227		5.9658		

t= Paired t test

Significant at P < 0.05

**Table (7): Relationship between diagnosis of the child and level of anxiety among parents in the study group**

Level of anxiety	Study group Pre orientation No (50)				Study group post orientation No (50)			
	Cyanotic congenital heart disease		A-cyanotic congenital heart disease		Cyanotic congenital heart disease		A-cyanotic congenital heart disease	
	No (3)	%	No (47)	%	No (3)	%	No (50)	%
Mild anxiety	0	0	13	6%	0	0	45	90%
Moderate anxiety	3	6%	34	68%	3	6%	2	4%
	.558				.001*			

Fisher exact test

Significance at P < 0.05

**Table (8): Relationship between diagnosis of the child and level of anxiety among parents in the control group**

Level of anxiety	Control group Pre orientation No (50)				Control group post orientation No (50)			
	Cyanotic congenital heart disease		A-cyanotic congenital heart disease		Cyanotic congenital heart disease		A-cyanotic congenital heart disease	
	No (5)	%	No (45)	%	No (5)	%	No (45)	%
Mild anxiety	4	8%	12	24%	4	8%	16	32%
Moderate anxiety	1	2%	33	66%	1	2%	29	58%
	.031				.143			

Fisher exact test

Significance at P < 0.05

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