

Effect of Mothers Instructional Guidelines on Selected Post Therapeutic Cardiac Catheterization Outcomes among Children

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Abstract

Back ground: Providing the best possible care for children requires the introduction of different therapeutic techniques for a wide range of congenital heart defects. **Aim:** To evaluate the effect of mothers' instructional guidelines on selected post therapeutic cardiac catheterization outcomes among children.

Subject and Method: Research Design: Quasi-experimental research design was used in the present study. **Setting:** The study was conducted at Post Cardiac Catheterization Intensive Care Unit of Cairo University Specialized Pediatric Hospital.

Subject: Purposive sample of 60 mothers of children who underwent Cardiac Catheterization were included and divided into two equal group, study and control groups. **Tools of data collection:** Structured Questionnaire sheet, Assessment of Mother's Knowledge, Assessment of Mother's Reported Practises and Post Cardiac Catheterization Assessment Record were used.

Results: There was a statistically significant difference in the total mean vital signs scores immediately after Cardiac Catheterization and one week after Cardiac Catheterization for the children in the study group, and in the mean knowledge and practice scores of the mothers in both groups.

Conclusion: A significant increase in knowledge and practice in caring for children after Cardiac Catheterization was reported while following instructional guidelines. Moreover, children of mothers who received educational guidance had fewer problems after Cardiac Catheterization.

Recommendation: Extensive prospective randomized studies are required to enhance postnatal outcomes.

Keywords: Cardiac Catheterization Children, Mothers' Instructions, Post Therapeutic

Introduction

American Medical Association stated that, Cardiac Catheterization involves inserting a small, long, flexible tube (catheter) into the heart and the principal veins surrounding the heart. The catheter is guided through the heart using fluoroscopy (X-ray equipment). Cardiac Catheterization carried out

among cardiac children to treat or diagnose cardiac diseases⁽¹⁷⁾.

According to Hockenberry, Wilson, and Rodgers, Childhood heart defect is a life-threatening event that disturb a child's health and family. Each year, around one in every 120 children born in the United States suffers from different

cardiac diseases. Cardiac catheterization should be performed to assess the cardiac condition, measure blood pressure, or take blood samples. As well as, X-ray dye can be administered through Cardiac Catheterization allowing images of structures in and around the heart to be obtained. Cardiac catheterization combines different treatments for cardiac defects ⁽¹¹⁾.

Wong mentioned that, Congenital Cardiac Disorders are the most prevalent congenital structural defect, occurring in 9 out of every 1000 live newborns. These structural CHDs include Transposition Great Arteries (TGA), Tetralogy of Fallot (TOF), Pulmonary Atresia (PA), Atrioventricular Canal Defect (AVCD), Pulmonary Artery Stenosis (PS), Atrial Septal Defect (ASD), Ventricular Septal Defect (VSD), Patent Ductus Arteriosus (PDA), and others ⁽¹⁵⁾.

According to Hockenberry, Wilson, and Winkelstein, with suggestions in cure, recent advances in diagnostic, medical, and surgical techniques have diminished death rate among children with cardiac defects the previous two decades. Moreover, providing the best care for these children improve their condition ⁽¹²⁾. According to Force, stated that cardiac catheterization was primarily a procedure in previous times, but now roughly two-thirds of all catheterization operations performed on children with CHDs

are interventional and more appropriate for treatment choices ⁽⁵⁾.

The child is admitted to Cardiac Catheterization Unit (CCU) before Cardiac Catheterization. the medical team who will share in cardiac catheterization performance should meet the child's family to explain the benefits and risks of cardiac catheterization, help the child and family agree to cardiac catheterization and prepare them physically, emotionally and psychologically for cardiac catheterization. Before Cardiac Catheterization, the nurse should check that the child's chest x-ray, Electrocardiogram (ECG), Echocardiography (ECHO), vital signs, health condition and certain blood tests. So, it is essential for nurse to meet the child and family the day before Cardiac Catheterization ⁽¹⁴⁾.

After Cardiac Catheterization, children are taken to the recovery room and monitored for several hours, then child went to CCU for follow up by nurses (5-8 hours) according the child's condition. It is better to guide treatment decisions, meaningful and accurate data for family, assessing pulmonary artery pressure to plan suitability for surgery, and others ⁽¹³⁾.

According to El Said, Hegde, Foerster, Hellenbrand, Kreutzer, Trucco, and Porras, Cardiac Catheterization had some complications which may be predicted and lead to rapid deterioration or death ⁽⁴⁾. WHO

found that rapid cardiac catheterization implementation associated with a better children outcomes after catheterization ⁽¹⁸⁾. Wong clarified that, there are post cardiac catheterization complications as arrhythmia, hypothermia or hyperthermia, pain, change in blood pressure, massive bleeding, or access site complications, heart perforation, cardiac tamponade, thromboembolism, shock, hypoxia, blood loss requiring transfusion, allergic reactions to anesthesia, renal insufficiency and others ⁽¹⁵⁾. According to Ali highlighted that cardiac catheterization necessitates the presence of skilled professionals such as pediatric cardiologists, pediatric nurses, radiologists, and laboratory technicians to manage a child after cardiac catheterization. Furthermore, children continuous observation post cardiac catheterization is crucial for early detection and management of any complications. Nursing care is important to enhance the child's comfort and prevent those complications. The catheterized extremity's peripheral pulse quality, capillary refill, and temperature must be palpated and documented regularly ⁽²⁾. Hockenberry & Wilson, emphasized that, mother has curisal role her child pre-and post- cardiac catheterization. Direct viewing of the catheterization site is possible with a dry, sterile dressing covered with a transparent dressing.

Hypothermia or hyperthermia should be avoided by using a warming cover or managing the temperature in the room, and monitoring the child continuously for nutrition, bathing, fluid intake, urination and elimination after cardiac catheterization ⁽¹³⁾. The mother must watch for any new additional warning indicators of potentially serious complications, follow medications as ordered, examine the puncture site for bleeding; check the pressure dressing for any leaking or bleeding from the puncture site, examine the site for swelling, redness, and pain, and assess the skin around the site for purple discoloration ⁽¹⁹⁾.

Significance of the study:

According to WHO ⁽¹⁸⁾ the number of children with cardiac abnormalities undergoing cardiac catheterization has increased. From 2014 to 2015, around 600 children with heart problems underwent cardiac catheterization. According to Ali, Abd El Aziz, Fattouh, and Mohamed, stated that, problems in therapeutic cardiac catheterization are more than diagnostic one. Because catheterization is an intrusive operation, it might result in problems such as arterial and venous puncture, and issues associated with heart disease ⁽¹⁶⁾. Mohamed and others, suggested in his Egyptian study that, the care of children with cardiac catheterization needs significant improvement. Cardiac Cath is appropriate to improve diagnostic

efficiency and ongoing therapeutic plan assessment ⁽¹⁾.

United Nations Children's Fund confirmed that, children with CHDs required various medical treatments, including cardiac catheterization, which may necessitate a longer hospital stay and higher costs. The cardiac catheterization should have enough medical, nursing, technical, and other personnel to predict and manage key events, evaluate results, and record adverse events as they occur ⁽¹⁹⁾.

According to Sahin and Meşe, care for children after a multidisciplinary medical team coordinated cardiac catheterization Nurses' clinical roles included comprehensively assessing patients' physical, psychosocial, and mental status. To conduct an initial assessment, complete the required documentation within organizational standards and conduct and document ongoing assessments such as observations, physical examinations, laboratory/laboratory results, and the child's response to procedural interventions. Plan care to achieve optimal outcomes, review and modify care plans as the child's condition changes, and assist other staff in providing care. This includes health education/discharge planning to improve optimal patient outcomes ⁽⁹⁾.

There are few studies on nursing and post-cardiac catheterization children in Egypt. Therefore, this study aimed to evaluate the effect

of mothers' instructional guidelines on selected post therapeutic cardiac catheterization complications among children. We hope this study's results will raise mothers' awareness of cardiac catheterization. In addition, it provides guidelines and suggestions which should be essential in pediatric nursing education, practice and research. Furthermore, Scientific standards of care children after cardiac catheterization are important for preventing any complications.

Operational definition: Selected Post Cardiac Catheterization Outcomes: referred to Local Vascular Complications such as (high or low temperature, nausea, vomiting, bleeding, and hematomas). As well as respiratory inefficiency was done as (decrease or increase breath rate, difficult breath and presence of cough) and cardiovascular inefficiency also as (decrease or increase heart rate, high or low blood pressure, capillary refill, and skin discoloration). Post Cardiac Catheterization Puncture (Wound) Complications were as local wound tenderness, swelling, oozing blood, redness, localized pain, and signs of poor wound healing such as redness or warmth around the wound, pus formation, bad odor, or darkening skin at the edges of the wound.

Aim of the study: evaluate the effect of mothers' instructional guidelines on selected post

therapeutic cardiac catheterization among children.

Research Hypotheses:

1- Implementing instructional guidelines for mothers are expected to improve their knowledge and practices regarding post therapeutic cardiac catheterization among children.

2-Children for mothers in study group are expected less post-cardiac catheterization complications than control group.

Subjects and Methods**Research Design:**

To achieve the target of the present investigation, a pre-posttest quasi-experimental research design was used in the present study. A true experimental design and a quasi-experimental design are quite similar, with the exception of the loss of one criterion: regulating or randomising (8).

Settings:

The present study was carried out at Cairo University Specialised Paediatric Hospital in two locations. It received children from all over Egypt affected with various heart diseases, congenital or acquired, at a great rate due to the scarcity of this specialty in the other hospitals.

1-The first setting was at the Post Cardiac Catheterization Intensive Care Unit is composed of eight beds.

2-The second one was the Cardiac Catheterisation Out-patient Clinic for follow-up.

Subjects:

A Purposive sample of 60 mothers having children undergoing cardiac catheterization participated in the current study.

-The first 30 mothers received instructional guidelines (study group).

-The second 30 mothers didn't receive the instructional guidelines (control group). The sample size was calculated via the formula of International Fund for Agricultural Institutions (1).

Inclusion criteria

- Children with congenital heart defects such as VSD, ASD, and PDA.

-Children undergoing cardiac therapeutic catheterization

- Both gender

- Children from 6 months to 5 years old.

Exclusion criteria

-Children were catching cardiac catheterization for diagnostic purposes.

-Children had any further illnesses or congenital abnormalities.

Data collection tools:**Four tools were used**

Following a review of the relevant literature utilising the following tools, the researcher developed every tool needed, with one exception of part II at Tool III, besides all necessary tools gathered by the researcher.

Tool I: Structured Questionnaire sheet to assess mothers' and their children information, it had the following three parts

Part (1): Mother's characteristic as age, education, occupation, and place of residence.

Part (2): Children characteristics as age, gender, rank, joined kindergarten, ability to play, appetite, and elimination.

Part (3): past and present medical history of child's cardiac disease about diagnosis, time of diagnosis, presence of other affected sibling, history of previous hospitalization, frequency of hospitalization, cause of hospital admission, child's weight, signs and symptoms, diagnostic tests, and treatment.

Tool II. Assessment of Mother's Knowledge about cardiac catheterization: To assess mothers' knowledge about cardiac catheterization, it comprised 15 questions were asked about the procedure's definition, purposes, indications, timing, complications, and treatments.

Scoring system:

Assessment of Mother's Knowledge Scores were 100 points. One hundred points were related to mothers' knowledge of cardiac catheterization. No or incorrect response got 0 point, an incomplete response got 1 point, and a complete answer got 2 points. A score of 60% or more (60 points) was viewed as satisfactory, whereas one of 60% or less (less than 60 points) was considered as unsatisfactory when the total score (100 points) was converted to 100%.

Tool III. Assessment of Mother's Reported Practises about cardiac

catheterization: **To assess mothers' reported practises about** caring for a child having cardiac catheterization, thirty seven questions about care of the puncture site, feeding, activity, bathing, accident prevention, follow-up, and treatment. were included.

Scoring system:

Assessment of Mother's Practises Scores were 100 points. All points were related to mothers' reported practises about caring for a child having cardiac catheterization. No or incorrect response got 0 point, an incomplete response got 1 point, and a complete answer got 2 points. A score of 60% or more (60 points) was viewed as satisfactory, whereas one of 60% or less (less than 60 points) was considered as unsatisfactory when the total score (100 points) was converted to 100%.

Tool IV: Post Cardiac Catheterization Assessment

Record: It included the following parts:

Part (1): Vital Signs: It records respiration, pulse, systolic and diastolic blood pressure, and axillary temperature of children. For statistical purposes, the estimation and determination of children's normal range of physiological parameters are based on Kliegman, and Geme (2020), a recent standardized pediatrics textbook.

Part (2): Assessment of Children's Pain Intensity: The Faces Pain Rating Scale (FPRS),

created by Wong and Baker (1983), consisted of 6 faces. It was used to measure children's pain levels. Pain levels assigned to each face using a number between 0 and 10. The values ranged from 0 (no pain/hurt) to 10 (highest pain/hurt). In addition, the scale exhibited strong reliability, as measured by Drendel, Kelly, and Ali (2011), with a Cronbach's alpha coefficient of 0.70.

Part (3): Monitoring of Local Vascular Complications such as (high or low temperature, nausea, vomiting, bleeding, and hematomas). As well as respiratory inefficiency was done as (decrease or increase breath rate, difficult breath and presence of cough) and cardiovascular inefficiency also as (decrease or increase heart rate, high or low blood pressure, capillary refill, and skin discoloration).

Part (4): Post Cardiac Catheterization Puncture (Wound) Complications were as local wound tenderness, swelling, oozing blood, redness, localized pain, and signs of poor wound healing such as redness or warmth around the wound, pus formation, bad odor, or darkening skin at the edges of the wound.

Mothers' Instructional Guidelines: -

In the current study, it included two parts,

Part (1): Mothers' knowledge about cardiac catheterization regarding its definition, purposes,

indications, timing, complications, and treatments.

Part (2): Mothers' practises about caring for a child having cardiac catheterization thirty seven questions about care of the puncture site, feeding, activity, bathing, accident prevention, follow-up, and treatment.were included.

Validity and Reliability: Five experts in pediatric surgical nursing reviewed the required tools in this study to determine whether the content was adequate or not. The comments should be changed according to experts. Experts' modifications were writing clarity, content adequacy, and item arrangement. Reliability of the tools tested in Cronbach's alpha test. The results of Tools 2 and 3 were quite reliable (0.74 and 0.86, respectively; component II at Tool 3 had a Cronbach's alpha reliability of 0.70).

Pilot study: A pilot study was conducted on six mothers of children undergoing cardiac catheterization to clarify the tool's contents and determine the time required to fill the tools. As a result, minor changes have been made, such as changing the wording of some districts. Based on the pilot study results, mothers of children participating in the pilot study were included in the study.

Procedure:

Assessment Phase:

For both groups:

Before conducting the study, official permission was obtained from the

directors of CUSPH and permission from the head of setting 1 and 2 (PCCICU and CCOC) after explaining the nature of the study. Then, the researcher introduced herself to the mothers' fulfilling study criteria and the study's aim before cardiac catheterization was performed within 7 days. Before cardiac catheterization, the written informed consent was gained from mothers in both study and control groups of children according to inclusion criteria to get their acceptance. The researcher discussed clear and simple explanations about the aim and nature of the study with mothers in both groups (control and study)

Implementaion Phase:

For Study Group:

Firstly, the participated mothers filled out **A Questionnaire With Structured Interview** (Tool 1) within 15-20 minutes in a quiet room in setting 1 (PCCICU). **Assessment of Mother's Knowledge & Assessment of Mother's Reported Practises** (Tool 2 & 3) completed by mothers alone for the first time as pre test. It took about 20-30 mins in the same room.

After one day, **Mothers' Instructional Guidelines** contained two sessions. The first session was for mothers about the definition of cardiac catheterization, functions, indications, time, complications, treatment, and care after implementation. It took about 20 - 30 minutes for a group of 3-5 mothers. Then after two days, mothers came to setting 1

(PCCICU) with their children for follow-up. As well as the second session included mothers about practices regarding caring for a child having cardiac catheterization, such as puncture site, bathing, feeding, activity, accident prevention, follow-up, and treatment. Again, it took 30 - 40 minutes for a group of 3-5 mothers. Arabic illustrated mothers' instructional guidelines distributed and explained for mothers in study group. It included two parts.

Part I consisted of knowledge about cardiac catheterization regarding its definition, purposes, indications, timing, complications, and treatments.

Part II referred to practises about caring for a child having cardiac catheterization, thrity seven questions about care of the puncture site, feeding, activity, bathing, accident prevention, follow-up, and treatment.

As well as. the researcher used an instructional illustrated Arabic booklet and re-demonstration of practices on a doll; educational videos and pictures were also distributed to each mother participating in the study group. After doing cardiac catheterization, the child was admitted to setting 1 (PCCICU) for follow-up within the first 6-8 hours after cardiac catheterization was performed. **Post Cardiac Catheterization Assessment Record** (Tool 4) filled at setting 1 (PCCICU) for child by the researcher for first time to be as

the baseline. It took about 20-30 mins.

Evaluation Phase:

For Study Group:

Then, on the follow-up day (after one week or 10 days of cardiac catheterization as doctor's request) at setting 2 (CCOC), the researcher completed **Assessment of Mother's Knowledge & Assessment of Mother's Knowledge & Assessment of Mother's Reported Practises** (Tool 2 & 3) for the second time from mothers as post test. Also, it took about 20-30 mins in a quiet room in setting 2 (CCOC). Then, the researcher filled **the Post Cardiac Catheterization Assessment Record** (Tool 4) in the same room for the second time as post test at setting 2 (CCOC). Again, it took about 20-30 mins.

For Control Group:

the participated mothers filled out **A Questionnaire With Structured Interview** (Tool 1) within 15-20 minutes in a quiet room in setting 1 (PCCICU). **Assessment of Mother's Knowledge & Assessment of Mother's Knowledge & Assessment of Mother's Reported Practises** (Tool 2 & 3) completed by mothers alone for the first time. It took about 20-30 mins in the same room.

After doing cardiac catheterization, the child was admitted to setting 1 (PCCICU) for follow-up within the first 6-8 hours after cardiac catheterization was performed. **Post Cardiac Catheterization**

Assessment Record (Tool 4) filled at setting 1 (PCCICU) for child by the researcher for first time to be as the baseline. It took about 20-30 mins.

Then, on the follow-up day (after one week or 10 days of cardiac catheterization as doctor's request) at setting 2 (CCOC), the researcher completed **Assessment of Mother's Knowledge & Assessment of Mother's Knowledge & Assessment of Mother's Reported Practises** (Tool 2 & 3) for the second time from mothers as post test. Also, it took about 20-30 mins in a quiet room in CCU. Then, the researcher filled **the Post Cardiac Catheterization Assessment Record** (Tool 4) in the same room for the second time as post test at setting 2 (CCOC). Again, it took about 20-30 mins.

The researcher provided an instructional illustrated Arabic booklet, educational videos, and pictures, which were also utilized and distributed to each mother in the study group at the end of study. The control group was collected after the completion of the study sample collection.

Ethical considerations: The researcher got approval from the research ethics committee of Cairo University's nursing faculty. After getting cooperation, the mothers of the children were given an extensive overview of the study's goals and procedures before being requested to sign a written consent form. Participation in the study was

optional for both the mother and the children in both groups. Mothers were free to leave the study at any moment without having to give a reason or have any impact on their children care. Consideration should be given to each child's and their mother's privacy. Data were first gathered from the study group according on fundamental philanthropic ethical standards, taking research ethics into consideration.

Statistical analysis:

The data obtained is presented and compressed in tabular format. The data was analysed statistically using SPSS version 20 (Social Survey Statistics Package). Data were computerised, and appropriate descriptive and inferential statistical tests were used to analyse the data. Frequency and percentage used to express qualitative data. The parametric chi-square test was utilised to compare qualitative variables. The paired-sample t-test was used to compare the means. The Pearson correlation coefficient was used to perform the correlations between the variables. As mean values of statistical significance threshold, we picked 0.05 and 0.001.

Results

Table (1) showed that 40% of the mothers in both groups were 25-30 years old. Furthermore, regarding the mother's educational level, half (50%) of the mothers in the study group were illiterate, whereas 36.7% of mothers in the control group had basic education. Finally,

regarding maternal occupation, most mothers in the study group (87.7%) and control group (73.4%) were found to work outside the home.

Table (2) clarified that more than two-fifths (43.3%) of the children in the study and control groups were between the ages of 1 and 3 years, and almost one-third (36.7%, 40%) of the children in both groups. Furthermore, in the study group, more than half of the children (53.3%) were male, and more than two-fifths (46.7%) were female, while the control group had the highest percentage of males (60%) and 40.0% of females. **Table (3)** found statistically significant differences between mothers' mean knowledge before and after receiving cardiac catheterization definition, function, time, complications, and treatment ($p < 0, 05$).

Table (4) illustrated that There were statistically significant differences were detected between the total mean score of mothers' practices before and after receiving instructional guidelines regarding the care of puncture site, bathing, feeding, activity, and follow up ($p < 0.05$).

Table (5) indicated that there was statistically significant difference was detected between mothers' knowledge and practices before and after receiving instructional guidelines ($p < 0.05$). **Table (6)** indicated that 63.3 %of mothers had insufficient knowledge and

practices compared to 36.7 % with sufficient knowledge and practices.

The last Table (7) showed statistically significant differences between children in both groups regarding many items. Table (8) highlighted that There was a statistically significant difference was detected between the total mean score of vital signs and oxygen saturation immediately after cardiac catheterization and after one week of cardiac catheterization for children in the study group regarding respiratory rate, pulse, and blood pressure ($p < 0.05$).

Table (9) revealed that there was a highly statistically significant positive correlation between mothers' knowledge and practices before receiving instructional guidelines $r=0.640$, $p=0.000$ and their level of education as well as there was a highly statistically significant positive correlation between mothers' knowledge and practices after receiving instructional guidelines $r=0.507$, $p=0.000$ and their level of education. It is evident from Table (10) that there was a highly statistically significant positive correlation between mothers' knowledge and practices after getting instructional guidelines and their place of residence. As well as there was a statistically significant positive correlation between mothers' knowledge and practices before receiving instructional guidelines and working status.

Table (1) Percentage Distribution of Mothers' characteristics in both groups.

Personal data	Study(n=30)		Control(n=30)	
	No	%	No	%
Mothers 'age/years: -				
< 20	2	6.7	1	3.3
20 to less than 25	5	16.7	10	33.4
25 to less than 30	12	40	12	40
30 to less than 35	6	20	4	13.3
35 to less than 40	4	13.3	2	6.7
40 and more	1	3.3	1	3.3
Mother's level of education:-				
Not read or write	15	50	7	23.4
Read and write	1	3.3	1	3.3
Basic education	7	23.4	11	36.7
Secondary school	4	13.3	7	23.4
University education	3	10	4	13.3
Mothers 'occupation: -				
Working outside home	26	86.7	24	73.4
Housewife	4	13.3	6	26.6

Table (2) Percentage distribution of children's characteristics in both Groups.

Child's characteristics	Study (n=30)		Control (n=30)	
	No	%	No	%
Child's age/years:-				
6 m to <1 yr.	11	36.7	12	40.0
1 to < 3	13	43.3	13	43.3
3 to 5	6	20.0	5	16.7
Mean \pm SD	1.81 \pm 1.61		1.91 \pm 1.64	
Gender: -				
Male	16	53.3	18	60.0
Female	14	46.7	12	40.0
Joined kindergarten:-				
Yes	9	30.0	9	30.0
No	21	70.0	21	70.0
Child's rank in the family:-				
First	12	40.0	12	40.0
Second	5	16.7	11	36.7
Third	6	20.0	5	16.7
More than third	7	23.3	2	6.6
Elimination:-				
Normal	25	83.3	21	70.0
Presence of Constipation	3	10.0	5	16.7
Presence of Diarrhea	2	6.7	4	13.3

Table (3) Comparison between Total Mean Scores of Mothers' Knowledge about cardiac catheterization Before and After Receiving Instructional Guidelines in the Study Group (n=30).

Items	Before Receiving Instructional Guidelines	After Receiving Instructional Guidelines	t-test	P value
	Mean ± SD	Mean ± SD		
Definition (10 marks)	2.3±2.1	6.3±1.2	0.73	0.001*
Functions (10 marks)	2.3±1.7	5.2±1.2	0.61	0.02*
Indications (5 marks)	1.3±0.3	3.3±1.2	1.55	0.062
Time (10 marks)	3.3±1.4	7.2±1.2	0.88	0.02*
Complications (10 marks)	0.3±1.1	2.3±1.2	0.9	0.01*
Treatment (5 marks)	0.7±1.7	3.2±0.4	0.56	0.002*

* Statistical significant at $P \leq 0.05$

Table (4) Comparison between Total Mean Scores of Mothers' Reported Practices Before and After Receiving Instructional Guidelines in the Study Group (n=30).

Items	Before Receiving Instructional Guidelines	After Receiving Instructional Guidelines	t-test	P value
	Mean ± SD	Mean ± SD		
Care of puncture site (10 marks)	0.3±1.1	6.3±1.2	0.93	0.001*
Bathing (10 marks)	2.3±2.3	6.2±2.2	0.51	0.000*
Feeding (5 marks)	1.3±0.3	4.3±0.2	0.55	0.02*
Activity (10 marks)	2.3±1.2	7.5±1.2	0.88	0.02*
Accidents prevention (5 marks)	1.3±1.1	2.3±1.2	1.9	0.61
Follow-up (5 marks)	0.7±0.5	3.2±0.4	0.36	0.002*
Treatment (5 marks)	1.3±1.1	2.2±1.2	0.9	0.53

* Statistical significant at $P \leq 0.05$

Table (5) Comparison between Mother's Knowledge & Practices Assessment Scores Before and After Receiving Instructional Guidelines in the Study Group (n=30).

Knowledge & Practices Assessment scores	Before Receiving Instructional Guidelines		After Receiving Instructional Guidelines		X ²	P value
	No	%	No	%		
Satisfactory	8	26.7	16	53.4	0.29	0.04*
	60.3±2.1		67.3±3.2			
Unsatisfactory	22	73.3	14	46.6	0.33	0.03*
	34.3±1.7		47.2±1.2			

* Statistically significant at $P \leq 0.05$

Table (6) Mother's Knowledge & Practices Assessment Scores in Control Group (n=30).

Knowledge & Practices Assessment scores	No Receiving Instructional Guidelines		X ²
	No	%	
Satisfactory	11	36.7	7.19
	60.3±4.1		
Unsatisfactory	19	63.3	6.43
	41.3±1.7		

* Statistical significant at $P \leq 0.05$

Table (7) Percentage Distribution of cardiac catheterization Complications among Children in the Study and Control Group After One Week.

Items	Study (n=30)		Control (n=30)		X ²	P	
	N	%	N	%			
Bleeding:						0.207	0.001*
Present	1	3.3	5	16.7			
Not present	29	96.7	25	83.3			
Tachycardia or bradycardia:						1.429	0.02*
Present	3	10.0	9	30.0			
Not present	27	90.0	21	70.0			
Weak or absent pulse:						2.143	0.000*
Present	2	6.7	15	50.0			
Not present	28	93.3	15	50.0			
Arrhythmia:						0.159	0.690
Present	1	3.3	4	13.3			
Not present	29	96.7	26	86.7			
Hypoxia:						0.159	0.690
Present	0	0.0	3	10.0			
Not present	30	100	30	90.0			
Hypotension:						0.062	0.001*
Present	3	10.0	12	40.0			
Not present	27	90.0	18	60.0			
Hypothermia:						0.089	0.000*
Present	2	6.7	12	40.0			
Not present	28	93.3	18	60.0			
Pseudoanuresm:							
Present	0	0.0	0	0.0			
Not present	30	100.0	30	100.0			
Hematoma:						0.315	0.02*
Present	1	3.3	7	23.3			
Not present	29	96.7	23	76.7			
Oligurea:						0.315	0.02*
Present	0	0.0	4	13.3			
Not present	30	100.0	26	86.7			
Puncture site characteristics:						0.401	0.03*
Presence of hematoma	1	3.3	5	3.3			
Bleeding	1	3.3	4	13.3			
Redness	1	3.3	1	3.3			
Swelling	1	3.3	5	16.6			
None of the above	26	86.7	15	50.0			
Presence of pain:						0.203	0.01*
Present	9	30.0	18	60.0			
Absent	21	70.0	12	40.0			

* Statistical significant at P < 0.05

Table (8) The Total Mean Score of Vital Signs and Oxygen Saturation Immediately After Cardiac Catheterization and After One Week Of Cardiac Catheterization for Children in Study Group:

Items	Immediately after Cardiac Catheterization	After one week of Cardiac Catheterization	t-test	P value
	mean \pm SD	mean \pm SD		
Respiratory Rate	34.7 \pm 4.2	29.5 \pm 3.2	1.56	0.00*
Oxygen Saturation	90 \pm 5.3	91 \pm 6.3	0.9	0.4
Pulse	87 \pm 9.8	83 \pm 8.3	1.03	0.00*
Temperature	37.65 \pm 1.7	37.1 \pm 1.4	2.4	0.2
Blood Pressure	83/60 \pm 15/9	80/55 \pm 13/8	0.98	0.00*
Capillary Refill	3.7 \pm 1.6	3.5 \pm 1.9	1.91	0.6

* Statistical significant at $P < 0.05$

Table (9) Correlation between Mothers' Level of Education and their Total Mean Score of Knowledge and Practices in the Study Group.

Mean \pm SD	No read& write (n=15)	Read & write (n=1)	Basic school (n=7)	secondary school (n=4)	University education (n=3)	R P
Before Instructional Guidelines	11.2 \pm 0.4	13.5 \pm 0.5	17.50 \pm 0.547	12.8 \pm 0.3	22.0 \pm 0.0	0.640 0.000**
After Instructional Guidelines	24.2 \pm 1.	26.3 \pm 1.9	31.3 \pm 0.8	36.0 \pm 2.3	37.8 \pm 1.6	0.507 0.000**

* Correlation is significant at $P \leq 0.05$, two-tailed.

Table (10) Correlation between Mothers' Place of Residence, Occupation, and their Total mean Score of Knowledge and Practices in the Study Group (n=30).

Items Mean±SD	Place of Residence		R P	Occupation		R P
	Rural (n=18)	Urban (n=12)		Working (n=26)	Housewives (n=4)	
Before Instructional Guidelines	22.02±4.4	26.5±6.4	R= 0.476 P= 0.000**	29.6±5.34	25.4±1.6	R= 0.311 P= 0.028*
After Instructional Guidelines	34.9±1.9	36.09±2.1	R= 0.417 P= 0.003**	34.9±1.9	31.6±1.5	R= 0.360 P= 0.010*

* Correlation is significant at $P \leq 0.05$, two-tailed.

Discussion:

According to the findings of the current study, 40% of the moms in both groups were between the ages of 25 and 30. In terms of mothers' educational status, it was discovered that 50% of moms in the study group couldn't read or write, compared to 36.7% of mothers in the control group who had just a very basic education. These findings were in line with a study conducted by Elsharkawy and Morsy⁽³⁾ in the cardiac catheterization Lab of Makassed General Hospital (MGH) in Beirut, Lebanon, on the impact of an illustrated educational guide on anxiety levels among 100 parents of children undergoing cardiac catheterization. Over half of the mothers who were studied were found to be between the ages of 20 and 30 years old. It was discovered that more than half of the mothers in the study group

could only read and write, and it was also discovered that the study group's mothers had a higher literacy rate than the control group's mothers. The Demographics Profile of Egypt for 2022 states that 71.5% of Arabic females are literate⁽²⁰⁾.

According to the current study, the control group had the highest percentage of males (60%) compared to the study group's (43.3%) children who were aged one to less than three years old and (53.3%) were male. In terms of age or gender, there was no statistically significant difference between the two groups of kids. These results were in agreement with those of Mohammed, Ahmed, and Rafaat⁽⁸⁾, carried out a study to evaluate the preparations for paediatric cardiac catheterization among 60 Egyptian children admitted to the Assuit University Children Hospital's Catheterization

Laboratory. Males made up the majority in both the research and control groups, and their ages ranged from two months to four years. In my view, it is critical for a cardiac youngster to have cardiac catheterization at this advanced age stage in order to treat, diagnose, and prevent further deterioration of the child's condition.

More than two thirds of children in both groups did not enrol in kindergarten, according to the findings of the current study. Additionally, it showed that most kids in both the research and control groups could play appropriately for their ages, had moderate appetites, and experienced typical excretion. These results were in line with those of Elsharkawy and Morsy⁽³⁾, who found that the majority of the study's participants did not attend kindergarten. My opinion is that any cardiac youngster who will have cardiac catheterization may exhibit a variety of symptoms that could affect their physical efforts and susceptibility to infection. Their parents did not sign them up for kindergarten as a result.

This study's findings made clear that there were statistically significant variations in mothers' mean knowledge ratings about cardiac catheterization's definition, function, time, complications, treatment, and care before and after getting it (p 0.05). These results are in line with a study by Mohammed, Ahmed, and Rifaat⁽⁸⁾, who highlighted the need for paediatric

cardiac catheterization preparations to include knowledge of cardiac catheterization importance, function, complications, and follow-up. Their study was conducted at Assuit University Children Hospital in Egypt.

The current investigation discovered a statistically significant difference in mothers' knowledge and behaviours between the times they received instructional guidelines and the times they did not (p 0.05). Additionally, the outcomes demonstrated that, after one week of cardiac catheterization for children in the study group, a statistically significant difference was found between the overall mean score of vital signs and oxygen saturation (p= 0.05). These findings were consistent with a study by Mahmood, Ibrahim, Hassan, and Abdulgani⁽⁷⁾ that evaluated nurses' expertise in post-cardiac catheterization patient care in mosul hospitals. in addition, it found that the highest percentage of children in the study group were admitted to the hospital with abnormal vital signs. From my point of view, the vital signs changes for a cardiac child is one of the initial changes for these cases, so it is important to follow health practice to minimize it.

The results of the current study demonstrated that there was a statistically significant difference between children in both groups regarding the presence of bleeding, tachycardia or bradycardia, absence or weak pulse, presence of

hypotension, hypothermia, hematoma, oliguria, and presence of puncture site pain after the implementation of the instructional guidelines after one week after cardiac catheterization. These results also support the current study's second proposed hypothesis. These findings were consistent with an Egyptian study conducted at Cairo University Specialized Pediatric Hospital by Mohamed, Mohamed, Ibraheim, and Elsis (1), investigated the effect of nursing guidelines for nurses on the occurrence of selected post cardiac catheterization complications in children. It found that, the largest percentage of children had normal vital signs after the implementation of the instructional guidelines.

In terms of the relationship between mothers' level of education and their overall mean score of knowledge and practises in the study group, the present study demonstrated a highly a statistically significant positive connection between mothers' knowledge and practises prior to receiving instructional guidelines and their level of education, as well as, The findings were consistent with a research by Hamdy, Aboeela, Madkour, Abdelmassih, Mahrous, and Kareem (6) on the impact of fluid flushed during paediatric cardiac catheterization operations on lung ultrasonography score in Egypt. It is advised that mothers of children with post-cardiac catheterization acquire the

information and skills necessary for quick recovery, in accordance with their level of education. Additionally, the recent study emphasised the significance of boosting mothers' awareness of how to care for kids with cardiac catheterization.

Conclusion:

This study concluded that mothers' knowledge and reported practices in post-cardiac catheterization child care (study group) improved significantly after implementing instructional guidelines. It also suggested that children of others who didn't received instructional guidelines had many post cardiac catheterization complications.

Recommendations

1 - Health education classes regarding to cardiac catheterization, diet, activity, and therapy, should be gave to raise mothers' awareness of caring for their children with cardiac catheterization.

2- A clear Arabic pamphlet outlining about cardiac catheterization, food, activities, therapy, and outcomes should be created and given to mothers who care for their children with cardiac catheterization

3- Comprehensive prospective randomised trials must be conducted before recommendations for enhancing post-cardiac catheterization outcomes for children undergoing cardiac catheterization can be made.

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