

## Mothers' Care for their Children with Open Heart Surgery

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### Abstract

**Background:** Open heart surgery is an incision that is made through the breastbone while the child is under general anesthesia. The aim of the study was to assess mothers' care for their children with open heart surgery. **Research design:** A descriptive research design was utilized to conduct this study. **Setting:** This study was carried out at the Cardiac Outpatient Clinic in the Kaluobia Governorate, which is connected to the Bahtem Health Insurance Hospital for Specialized Surgeries. **Sample:** Purposive sample was used in this study. It included 150 mothers whose children had open heart surgery. **Tool of data collection:** one tool was used and consisted of five parts: A structured interviewing questionnaire to assess socio demographic characteristics of mothers, personal characteristics of children, medical history of children, knowledge of mothers about open heart surgery, and reported practices of mothers care for their children with open heart surgery. **Results:** 48.7% of the studied mothers were between the ages of 20 and fewer than 35 years old. 50% of the studied children aged 1 to less than 5 years, 63.3% of them were boys. 48% of the studied mothers had average total knowledge level about open heart surgery. 55.3% of studied mothers had satisfactory total reported practices level regarding open heart surgery. **Conclusion:** there was positive highly statistically significant correlation between total knowledge score, and total reported practices score of mothers regarding open heart surgery. **Recommendation:** Develop health educational program for mothers whose children had open heart surgery to increase mothers' understanding of open heart surgery, and their care for children with open heart surgery.

**Key words:** Mothers' Care, Children, Open Heart Surgery.

### 1. Introduction

Open Heart Surgery (OHS) is an incision that is made through the breastbone while the child is under general anesthesia. Tubes are used to re-route the blood through a special pump called a heart lung bypass machine. This machine adds oxygen to the blood to keep it warm and circulatory throughout the body while the surgeon repairs the heart. In certain circles, it's referred to as a closed heart operation. OHS can be performed using a camera and specialized equipment. With this method, a heart-lung bypass machine is typically not required. This method cannot be used to cure every cardiac defect [14].

Worldwide, more than 5,000 cardiac surgeries are carried out on children in the United Kingdom every year. Cincinnati Children's Hospital Medical Center performs about 300 open heart surgeries every year. In the United States about 22,000 pediatric open heart operations are carried out each year [7].

Open heart surgeries treat heart problems including heart failure, arrhythmias including atrial fibrillation, thoracic aortic aneurysm, heart valve disease, coronary artery disease, and congenital heart defects as atrial septal defect or hypoplastic left heart syndrome [18].

Children post open heart surgery need to recover at home for a minimum of three to four more weeks.

Recovery from surgery might take up to eight weeks. Pain is common post open heart surgery due to cut or irritated nerves [3].

Mothers care is very important for children with open heart surgery. So, mothers need to understand the condition of children and learn about care of the incision, activities that can be allowed for children with open heart surgery, food, importance of dental hygiene, and others after OHS. Health education for mothers in advance of hospital discharge should be started as soon as possible to reduce uncertainty and give mothers confidence that they can care children at home [11].

Community Health Nurses (CHNs) are vital in supporting mothers whose children have open heart surgery by providing education, and guidance, as well as developing care plans, acting as a liaison between the medical community and the mothers themselves. Health education is crucial regarding contributing elements like illness, child care, nutritional status emphasis programs, and feeding issues. In addition to encouraging mother engagement in the treatment of children with heart diseases, CHNs should provide mothers of children with heart diseases guidance regarding illness and lines of management [9].

### Significance of the study

The global heart center performs 12,000 open heart surgeries every year, with 70% of those cases involving children. Aswan Heart Centre performs about 1,000 open

heart surgeries annually 60 percent of them are on children [16].

The Ministry of Health and Population in Egypt reported that open heart surgeries and cardiac catheterization had the highest rates of surgical interventions exceeding 70% of the total operations performed, with a total of 43,692 operations including 34,549 cardiac catheterizations, and 7,143 open heart operations [23].

## 2. Aim of the study:

This study aimed to assess mothers' care for their children with open heart surgery.

### Research questions:

1. What is the mothers' knowledge regarding open heart surgery?
2. What are the mothers' reported practices regarding their care provided to their children post open heart surgery operation?
3. Is there a correlation between knowledge of mothers and their reported practices regarding their children post open heart surgery?

## 3. Subjects and Method:

### Research design:

A descriptive research design was utilized to conduct this study.

### Settings:

This study was carried out at the Cardiac Outpatient Clinic in Kaluobia Governorate, which is connected to the Bahtem Health Insurance Hospital for Specialized Surgeries

### Sampling:

Purposive sample was used in this study. It included 150 mothers whose children had open heart surgery. The study sample was selected according to following criteria: Mothers of children who had open heart surgery within the first three months following the procedure, and free from any handicap and chronic disease.

### Tool of data collection:

**One tool was used to collect data which include:**  
A structured interviewing questionnaire was developed by researchers and consisted of five parts:-

**First part:** Concerned with socio demographic characteristics of mothers as age, occupation, level of education, place of residence, and monthly income.

**Second part:** Concerned with personal characteristics of children as age, level of education, gender, and child order.

**Third part: A-** Concerned with past medical history of children as family history and onset of heart disease. **B-** Concerned with current medical history of children as type of operation.

**Fourth part:** Concerned with knowledge of mothers about heart, heart diseases, and open heart surgery, and included 21 items.

### Scoring system:

Mothers' knowledge was graded using following formula: 2 score for correct and complete answer, 1 score for correct and incomplete answer, and 0 for wrong answer or don't know. The final score for each knowledge domain was calculated by dividing the sum by the total number of questions. These scores were translated into a percentage. The total knowledge score = 42 points was considered good if the total score  $\geq 75\%$  (31 points), while considered average if the total score equaled  $50 < 75\%$  (21<31points), and considered poor if the total score was  $< 50\%$  (21points)

**Fifth part:** Concerned with reported practices of mothers for their children with open heart surgery, and included 78 items.

### Scoring system:

Mothers' reported practices were scored using the following formula: 1 score for done, and 0 score for not done. For each area of practices, the scores of items were added together and the total divided by the number of items. These scores were translated into a percentage for the part. The total practices score = 78 points was considered satisfactory if the total score  $\geq 60\%$  (47 points), and considered unsatisfactory if the total score  $< 60\%$  (47 points).

### Content validity and reliability:

The tool validity was performed by five members of Faculty's Nursing Benha University experts in community health nursing specialties. These members evaluated the tool for clarity, relevance, comprehensiveness, applicability and give their opinion.

The researchers used the tool's reliability to assess its internal consistency. Reliability for knowledge was .983 and practice was .978.

### Ethical considerations:

The Benha University Faculty of Nursing Scientific Research Ethical Committee accepted this study. Every ethical concern was guaranteed. Prior to performing the interview, each mother provided oral consent and received a brief explanation of the study's objectives. The interviewing questionnaire was conducted by the researchers for the mothers at Cardiac Outpatient Clinic

at Bahtem Health Insurance Hospital for Specialized Surgeries in Kaluobia Governorate, after getting of the necessary official permission from the Dean of the Faculty of Nursing, Benha University to the Administration of the previously mentioned setting to conduct the study. The researchers introduced themselves to mothers using a simple Arabic language. They also received assurances that all data collected would be kept private and utilized exclusively for the objectives of the research. Anonymity and confidentiality were guaranteed by not requiring names on the forms. Additionally, they were made aware of their freedom to leave the research at any moment and without explanation.

#### **Pilot study:**

The pilot study was carried out on 10% of the sample size (15 mothers). The pilot study was aimed to assess the tool clarity, applicability and time needed to fill the tool, completing the tool consumed about 30 minutes. The pilot study sample was incorporated into the overall sample without any alterations.

#### **Preparatory phase:**

An extensive review of the past and present national and international references relevant to the research topic, using a journal, textbooks and online search was conducted. This was required for the researchers to help with the development of the data collection tool and become familiar with various facts of the research challenge. The tool's preparation took about two months.

#### **Fieldwork:**

The data was collected from mothers that attended in the previously selected setting through the interview with them. The study was conducted at a period of 6 months which started from the beginning of February 2023 to the end of July 2023. The researchers attended two days per week from 9.00 am: 12 pm to collect data, and the average number of interviewed mothers was between 3-4 mothers per day depending on their responses to the interviewers, each interviewed mother took about 30 minutes to fill the tool depending upon their understanding and response.

#### **Statistical design:**

The Statistical Package for Social Science (SPSS) version 21 was used to organize, tabulate, and analyze all of the data that were gathered. For a qualitative descriptive data, frequencies and percentages were used; for relation tests, the chi-square coefficient  $\chi^2$  was used; for quantitative data, mean and standard deviation were

used; and for correlation analysis, the Pearson correlation coefficient ( $r$ ) was used to determine the degree of significance.

#### **4. Results**

**Table (1):** Reveals that; 48.7% of the studied mothers who were between the ages of 20 and 35 had a mean and standard deviation was  $24.60 \pm .911$ , 62% of them were not working (housewives), 40% of the studied mothers graduated from secondary school, 67.3% of them were from rural regions.

**Table (2):** Reveals that; 50% of the studied children who were between the ages of one and five had a mean and standard deviation was  $3.980 \pm .847$ , 58.7% of them were at nursery stage, 63.3% of them were boys, and 44% of the children ranked second.

**Table (3):** Illustrates that; 55.3% of the studied children had cardiac disease between the ages of 1 and less than 4 years, 48.7% of them were hospitalized due to heart diseases twice or more, 33.3% of them were hospitalized due to narrowing of the coronary arteries, 80% of them didn't undergo previous heart surgical operation, 64% of them had family member suffered from heart diseases, and 56.3 % of them had first degree of kinship.

**Table (4):** Illustrates that; 64.0% & 69.8% of the children had suffered from chest pain before doing open heart surgery and from three to five months respectively, 75% of them had severe pain, 100% of them had suffered from any symptoms before doing open heart surgery, and 53% of them suffered from increasing heart rate, 45.3% of them had done open heart surgery within the previous month, 46.7% of them performed arterial bypass, 56.7% of them had current symptoms as tightness and pain in the chest, and 72.7% of their health improved slowly.

**Figure (1):** Illustrates that; 48% of the studied mothers had average total knowledge level about open heart surgery, 28.7% of them had poor total knowledge level about open heart surgery and only 23.3% of them had good total knowledge level about open heart surgery.

**Figure (2):** Illustrates that; 55.3% of mothers in the study reported having satisfactory total reported practice level regarding open heart surgery, and while 44.7% of them having unsatisfactory total reported practice level.

**Table (5):** Reveals that; there were positive highly statistically significant correlation between overall knowledge score, and total reported practices score of mothers regarding open heart surgery.

**Table (1)** Frequency distribution of the studied mothers regarding their socio demographic characteristics (n=150).

<b>Socio demographic characteristics</b>	<b>No.</b>	<b>%</b>
<b>Age / years</b>		
>20	10	6.7
20 - >35	73	<b>48.7</b>
35 - >40	33	22.0
≤40	34	22.7
<b>Mean ±SD 24.60 ± .911</b>		
<b>Occupational status</b>		
Working	57	38.0
Not working (Housewives)	93	<b>62.0</b>
<b>Level of education</b>		
Cannot read and write	22	14.7
Basic education	22	14.7
Secondary education	60	<b>40.0</b>
University education or more	46	30.7
<b>Place of residence</b>		
Rural	101	<b>67.3</b>
Urban	49	32.7
<b>Monthly income</b>		
Enough	<b>112</b>	<b>74.7</b>
Enough and save	7	4.7
Not enough	31	20.7

**Table (2)** Frequency distribution of the studied children regarding their personal characteristics (n=150).

<b>personal characteristics</b>	<b>No.</b>	<b>%</b>
<b>Age / years</b>		
1 - >5	75	<b>50.0</b>
10 - >15	42	28.0
15 - ≥18	33	22.0
<b>Mean ± SD 3.980 ± .847</b>		
<b>Level of education</b>		
Nursery	88	<b>58.7</b>
Primary	37	24.7
Preparatory	25	16.6
<b>Gender</b>		
Boy	95	<b>63.3</b>
Girl	55	36.7
<b>Child ranking</b>		
The first	34	22.7
The second	66	<b>44.0</b>
The third	46	30.7
The fourth	4	2.7

**Table (3)** Frequency distribution of the studied children regarding their past medical history (n=150).

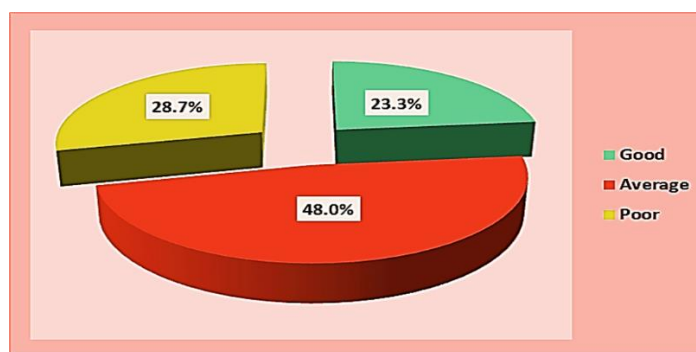
<b>Past medical history</b>	<b>No.</b>	<b>%</b>
<b>Onset of heart disease / years</b>		
> 1	55	36.7
1- > 4	83	<b>55.3</b>
4- ≥ 8	12	8.0
<b>Times of hospitalization due to heart diseases</b>		
Once	57	38.0
Twice or more	73	<b>48.7</b>
None	20	13.3
<b>*Reasons of hospitalization</b>		
Narrowing of the coronary arteries	50	<b>33.3</b>
Regurgitation of one or more heart valves	44	29.3
Heart rhythm disturbances	10	6.7
Heart muscle failure	29	19.3
Heart murmur	17	11.3
<b>Undergoing surgery before</b>		
Yes	30	20.0
No	120	<b>80.0</b>
<b>Yes, type of surgery (n=30)</b>		
Diagnostic catheterization	4	13.3
Therapeutic catheterization	26	<b>86.7</b>
<b>Therapeutic catheterization was done (n=26)</b>		
Balloon expands	7	26.9
Installing supports	19	<b>73.1</b>
<b>Type of braces was installed (n=19)</b>		
Ordinary stents	6	31.6
Therapeutic stents	10	<b>52.6</b>
Vital stents	3	15.8
<b>Family history of heart diseases</b>		
Yes	96	<b>64.0</b>
No	54	36.0
<b>Yes, degree of kinship (n=96)</b>		
First degree	54	<b>56.3</b>
Second degree	22	22.9
Third degree	13	13.5
Fourth degree	7	7.3

\*Answers are not mutually exclusive

**Table (4)** Frequency distribution of the studied children regarding their current medical history (n=150).

<b>Current medical history</b>	<b>No.</b>	<b>%</b>
<b>Chest pain before open heart surgery</b>		
Yes	96	<b>64.0</b>
No	54	36.0
<b>Duration of chest pain (n=96)</b>		
From one month to two months	24	25.0
From three to five months	67	<b>69.8</b>
More than five months ago	5	5.2
<b>Severity of chest pain severity (n=96)</b>		
Mild	9	9.4
Moderate	15	15.6
Severe	72	<b>75.0</b>
<b>Other symptoms before open heart surgery</b>		
Yes	150	<b>100</b>
<b>Yes, symptoms (n=150)</b>		
Rapid breathing	76	50.7
Increasing heart rate	80	<b>53.3</b>
Swelling in the legs	38	25.3
Exhaustion and fatigue	23	15.3
<b>Time post open heart surgery</b>		
> month	68	<b>45.3</b>
1- >2 months	52	34.7
2- ≥3 months	30	20.0
<b>Type of surgery</b>		
Valve repair	30	20.0
Change valves	33	22.0
Arterial bypass	70	<b>46.7</b>
Correction of birth defects	17	11.3
<b>*Current symptoms and problems that the child suffered</b>		
Chest pain	85	<b>56.7</b>
Arrhythmia	43	28.7
Difficulty of breathing	22	14.7
Dizziness and fainting	12	8.0
High temperature	13	8.7
Infection in the chest wound	7	4.7
<b>Child's progress post open heart surgery</b>		
Improving quickly and well	38	25.3
Improving slowly	109	<b>72.7</b>
Not improved	3	2.0

\*Answers are not mutually exclusive



**Fig. (1)** Percentage distribution of the studied mothers regarding their total knowledge level about open heart surgery (n=150).

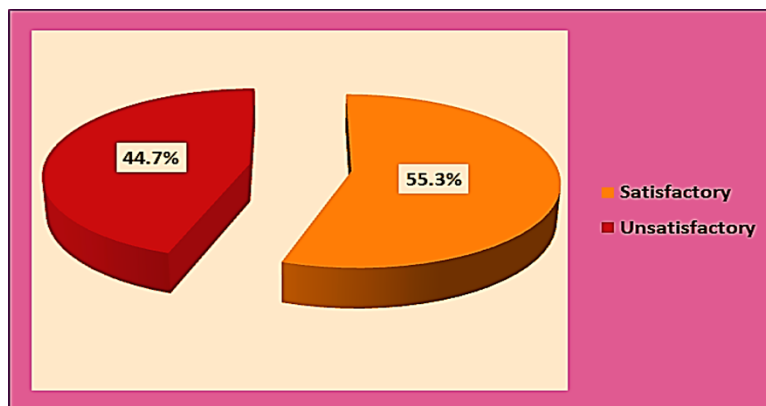


Fig. (2) Percentage distribution of the studied mothers regarding their total practice level about open heart surgery.

Table (5) Correlation between the studied mothers’ total knowledge score and total reported practices score regarding open heart surgery (n=150).

Items	Total knowledge score	
	r	p-value
Total reported practices score	.827	.000**

5. Discussion

Open heart surgery is one of the most crucial surgical procedures for treating a variety of heart issues. Critical procedures include valve replacement or repair, myocardial revascularization, fixing congenital or acquired structural abnormalities, implanting a mechanical assist device, and heart transplantation. Globally, the most often carried out procedures in cardiac surgery are heart valve replacement and coronary artery bypass grafting. The post-operative phase is the most crucial time for children undergoing open heart surgery. It is marked by a variety of complications, including respiratory, cardiovascular, neurological, and renal diseases, which extend hospital stays, raise expenses, and directly impact survival rates [2].

Regarding socio demographic characteristics of the studied mothers, this study revealed that about half of the mothers were between the ages of 20 and fewer than 35. The finding of this study was consistent with [19] who studied “Mothers health awareness toward their children undergoing congenital

heart surgery” and found that 57.1% of mothers were between the ages of 20 and fewer than 35years. However, the finding of this study, this study result was in contrast with [10] who studied "Knowledge, attitude and practice of parents’ of children with congenital heart disease in a developing country" and reported that 31.0% mothers were older than 40.

Regarding to educational level of mothers, the current study revealed that two fifth of the studied

mothers had graduated from secondary school. This study result supported by [25] who studied "Assessment of mothers' knowledge regarding care of children connected with permanent pacemaker" and reported that 34% of the mothers had completed secondary school. However, the study finding was in contrast with [6] who studied “Postoperative health-related quality of life in children with congenital heart disease: a short-term follow-up study” and found that 50.6% of parents had junior high school or lower.

Regarding to occupational status of mothers, the current study showed that more than three fifth of the studied mothers were housewives. This study finding was consistent with [11] who studied "Guiding program for mothers to enhance home care and children’s health outcomes after cardiac surgery" and showed that 70.8% were housewives.

Regarding to place of residence of mothers, the result of current study illustrated that more than two third of studied mothers lived in rural areas. This study result was consistent with [22] who studied “Mothers caring for children suffering from congenital heart diseases” and reported that 66.7% were living in rural regions. However, the finding was in contrast with [1] who studied" Impact of comprehensive discharge program on patients' outcomes after open heart surgery" and reported that 77.3% of patients were from cities.

Regarding to personal characteristics of children, the current study illustrated that half of the studied children were between the ages of 1 and less than 5 years old. The

finding of this study corroborated with [10] who reported that 42.5% of them were between the ages of 1 and 5. However, this study finding disagreed with [ ] who studied " Health-related quality of life in surgical children and adolescents with congenital heart disease compared with their age-matched healthy sibling: a cross-sectional study from a lower middle-income country, Pakistan" and found that more than half of studied sample was between the ages of 5 and 9.

Regarding to children gender, this study results showed that less than two third of them were boys. This finding was in line with [17] who studied "Factors influencing caregivers' uncertainty of children undergoing cardiac surgery in Bangkok, Thailand" and reported that 58.6% of the studied children were males. However, this study disagreed with [4] who studied " Role of tracheostomy in pediatric patients who underwent heart surgery: a single-center experience " and reported that 50.8% of them were female. This might be due to genetic variables that suggest estrogen hormone shields female from heart problems.

Regarding to children ranking, the current study's results indicated that more than two fifth of children ranked second in ranking. This study finding agreed with [11] who reported that 45.8% of children ranked in second birth order. However, this study result disagreed with [24] who studied "Psychiatric disturbances in patients undergoing open-heart surgery" and reported that 46.7% of the studied children were the first in their family.

Regarding to educational level of children, this study illustrated that more than half of them were at nursery stage. This study finding disagreed with [25] who reported that more than half 52% of children didn't join kindergarten.

Regarding to family history of heart diseases, this study revealed that less than two third of them had family member suffered from heart disease. This study finding agreed with [12] who studied " The effect of pre-hospital discharge care program on mothers' knowledge and reported practice for children after congenital heart surgery" and discovered that 66.7% of the studied infants had a family history of heart disease. However, this finding disagreed with [2] who studied " Effect of nursing procedures related pain on post open heart surgery patients' clinical outcomes" and reported that 20% had history of cardiac disease.

Regarding to knowledge about open heart surgery, this study showed that nearly half of the studied mothers had average total knowledge level about open heart surgery. This study result was in the same line with [20] who found that 55% of the mothers had moderate knowledge. However This study disagreed with [21] who studied " Effectiveness of discharge educational program on quality of life and post-operative complications for children after cardiac surgery" and found that 75% of the

studied mothers have unsatisfactory level of knowledge. This may be due to two fifth of the studied mothers had secondary education, inadequate explanations from health care providers and a lack of health education about cardiac surgery itself.

Regarding total practice about open heart surgery, the current study illustrated that more than half of studied mothers had satisfactory total practice level concerning open heart surgery. This study result was consistent with [13] who studied "Mothers' care for their infants with congenital heart anomalies" and reported that 71% of the studied mothers' total practices were satisfactory. However, the findings of this study were disagreed with [19] who reported that 91.4% of total mothers' practice was unsatisfactory. This might be related to family education system in the hospital which is responsible for providing regular teaching for mothers with children after open heart surgery and ensuring the mothers have gained the necessary skills needed for caring for their children at home.

According to correlation between the studied mothers' total knowledge score and total reported practices score regarding open heart surgery, the current study found a positive highly statistically significant correlation between mothers' total knowledge and their total reported practices regarding open heart surgery. This study result agreed with [5] who studied "Home care needs and symptoms of children undergoing heart surgery and quality of life of parents" and stressed that extremely significant positive association between parents' knowledge and level of practice about care for their children following discharge. On the contrary, this study finding was contrary to [8] who studied " Discharge plan for mothers of children after congenital heart surgery " and found that there wasn't any correlation between the total knowledge score and the total reported practices.

## 6. Conclusion

Nearly half of the studied mothers had average overall level of knowledge regarding open heart surgery, and just 23.3% had good level of understanding, more than half of studied mothers had satisfactory total reported practice level regarding open heart surgery, and there was positive highly statistically significant correlation between total knowledge score, and total reported practices score of mothers regarding open heart surgery.

## 7. Recommendations

- Develop health educational program for mothers whose children with open heart surgery to enhance their understanding and proficiency in open heart surgery.

- Implement tele-nursing application for post-operative heart surgery to focus on mothers' home care for their children with open heart surgery.



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