

## Assessment of Nurses' Performance Regarding Postoperative Care of Children with Cardiac Surgery

Amal Sabry Abd El Samiea<sup>1</sup>, Iman Ibrahim Abd El-Moniem<sup>2</sup>, Salma El-Sayed Hassan Mohamed<sup>3</sup>.

<sup>1</sup> Assistant Lecturer of Pediatric Department, Faculty of Nursing, Modern University for Technology and Information, Cairo, Egypt.

<sup>2</sup> Professor of Pediatric Nursing Department, Faculty of Nursing, Ain Shams University, Cairo, Egypt.

<sup>3</sup> Professors & Head of Pediatric Nursing Department, Faculty of Nursing, Ain Shams University, Cairo, Egypt.

### Abstract

**Background:** Cardiac surgery places children at risk for numerous significant health problems and complications. Children with surgical procedures require an earlier intervention to improve outcome. Systematic nursing intervention is vital during the post-operative period to identify rapidly any complication and deterioration in children condition. **Aim** of this study was to assess the pediatric nurses' performance regarding postoperative care of children with cardiac surgery. **Design:** A descriptive study design was used. **Setting:** The study was carried out at the Pediatric Intensive Care Units for postoperative heart surgery in Cardiac Surgery Academy. **Subject:** A purposive sample composed of 60 nurses working at the previously mentioned setting and giving care for children with cardiac surgery. **Tools:** It included two tools; a predesigned interviewing questionnaire and observation checklists. **Results:** Half of studied nurses their age ranged from 25 to 30 years and more than half of them had 5 to 10 years of experience. Less than one quarter of the studied nurses had satisfactory total knowledge while less than half of them had competent practices regarding care of children with cardiac surgery. There was a significant correlation between total knowledge and total practices of studied nurses ( $P$  value  $< 0.05$ ). **Conclusion:** It can be concluded that, slightly more than one third of the studied nurses had competent level of performance regarding postoperative care for children undergoing cardiac surgery. **Recommendations:** Continuous educational training programs should be organized for the nurses especially newly joined nurses to improve their knowledge and practice regarding cardiac surgery.

**Keywords:** Cardiac Surgery, Postoperative Care, Nurses' Performance, Children.

### Introduction

Congenital heart defects (CHDs) remain a major public health problem in the United States (US) and other industrialized nations. The reported prevalence of (CHD) at birth ranges from 6 to 13 per 1000 live births. In spite of dramatic advances in treatment over the last fifty years, cardiac defects account for a large proportion of infant mortality (Wren et al., 2012).

The congenital heart defects (CHDs) are repaired during a surgical procedure involving open heart surgery and cardiopulmonary bypass. Surgeries depend on the type of heart problems (Datta, 2010, Abdelnabey, et al., 2014).

Heart surgery plays an important role in the management of wide range of

cardiovascular diseases (CVD) and encompasses the care of a patient with greater acuity and complexity. Cardiac surgery, including coronary artery bypass grafting (CABG) and heart valve surgery represent the most common classes of surgical procedure performed globally (Abdallah, 2012).

Systematic nursing assessment is vital during the post-operative period to identify rapidly any complications and deterioration in children condition and include monitoring cardiovascular status, ventilator parameters, fluid balance and neurological status (Tucker et al., 2019).

Typically, entry-level nursing education programs provide some basic exposure to general pediatric nursing, but little direct experience in critical is offered. Academic programs in critical care nursing or PCCN are

generally restricted to graduate advanced practice programs for clinical nurse specialists or nurse practitioners. Every PICU needs to maintain an orientation program for new staff that can be readily tailored to the variable needs of new staff (Ni et al., 2016).

### **Significance of the study:**

Heart disorders incidence is ranged from 7 to 8 children per 1000 lives birth at Egypt. In spite of dramatic advances in treatment over the last fifty years, cardiac defects account for a large proportion of infant mortality. Heart disorders are representing a major health problem among Egyptian children. So, in the researcher point of view, heart disease in Egypt need more specialized studies to achieve the optimal level of recovery for postoperative heart surgery. It was observed from the clinical experience or the researcher that, the nurses lack of knowledge and skills regarding care of children with CHDs which result in dangerous complications such as bleeding, wound infection and heart failure, are fairly predictable.

### **Aim of the Study:**

The study aimed to assess nurses' performance regarding postoperative care of children with cardiac surgery. This aim was achieved by:

- Assess nurses' knowledge regarding postoperative care of children with cardiac surgery.
- Assess nurses' practices regarding postoperative care of children with cardiac surgery.

### **Research question:**

- What is the pediatric nurses' performance regarding postoperative care of children with cardiac surgery?

### **Subjects and Methods:**

**Research Design:** A descriptive exploratory research design was utilized.

**Research Setting:** The study was conducted in Pediatric Intensive Care Units (PICUs) for postoperative heart surgery at Cardiac Surgery Academy affiliated to Ain Shams University. Cardiac Surgery Academy specialized in treating diseases and surgeries of the heart and blood vessel. It consists of 300 beds. However it does not operate at all its capacity because there are two floors are still under construction. The Pediatric Intensive Care Units (PICUs) for postoperative heart surgery is located on the seventh floor; including 17 beds for pediatric patients and 2 rooms for isolated cases.

**Research Subjects:** A purposive samples including 60 nurses, representing all nurses who are working in the previously mentioned setting. They had different nursing educational categories. In addition to 53 children who are undergoing cardiac surgery at the time of the study, were recruited. Inclusion criteria involved full time nurses working at the previously mentioned settings and giving care for children with cardiac surgery regardless their age, their level of education and years of experiences. Children aged more than 40 days to 16 years from both gender undergoing cardiac surgery for the first time were enrolled.

**Data were collected by using the following tools:**

#### ***1- A structure interview questionnaire***

It was designed by the researcher after reviewing related literature and was written in simple Arabic language and revised by the supervisors.

This tool was divided into two parts:

**Part A:** This part was concerned with the characteristics of:

- Nurses' characteristics such as age, gender, education level, and past experience.
- Children's characteristics such as age, gender, and their diagnosis.

**Part B:** This part dealt with knowledge of nurses. It consisted of 70 questions in the form of multiply choice questions and essay questions to assess nurses' knowledge related to cardiac surgery as anatomy and physiology of the heart, the circulatory system, congenital heart diseases, cardiac surgery, and post-operative nursing management for children undergoing cardiac surgery.

**Scoring system:** According to the answers obtained from the studied nurses, a scoring system was followed to assess the nurses' knowledge, each question scored two marks for a correct and complete answer, one mark for correct and incomplete answer and zero for an incorrect answer or no answer, and accordingly the nurses' knowledge was categorized into; Unsatisfactory knowledge less than 60% and Satisfactory knowledge 60% and more.

### 2- *Observational Checklists:*

It were adopted from different references to assess nurses' practice regarding care for children with cardiac surgery; from **Lynn, (2015)** to assess nurse's practice measuring vital signs, it contained 25 steps, **Taylor et al., (2011)** to use pulse oximetry, it contained 17 steps, **Taylor et al., (2011)** to assess central venous pressure, it contained 21 steps, **Ethel and Toby, (2006)** to assess nursing care provided to naso/oropharyngeal suctioning, it contained 27 steps, **Gibbs, (2010)** to assess nursing practice regarding wound dressing, it contained 19 steps, **Coffin et al., (2014)** to assess nursing practice regarding urinary catheter care, it contained 25 steps, **Vicky and Cindy, (2016)** to assess nursing practice regarding care of chest tube, it contained 17 steps.

**Scoring system:** As regards the scoring system for nurses' practices, a score one was given to the nurses for each step done correctly and zero for each step done incorrectly or not done, the nurses' scores were summed up and converted to percentage and accordingly the nurses' total practices were categorized into : competent level was 80% and more and Incompetent level was Less than 80%.

### 3- *Medical record:*

It was used to assess the child's disease as diagnosis, duration of illness, clinical manifestations, times of hospital admission and medications.

### **Validity and reliability:**

The tools were tested for their content validity by a jury of five expertises in the field of pediatric medicine and pediatric nursing. Three Prof of pediatric nursing in faculty of nursing Ain Shams University and two Prof of assist professor of pediatric medicine in faculty of medicine Ain Shams University and Cairo University. The required modifications were carried out accordingly. Testing reliability of the study tools was done by Cronbach alpha, the results was 0.78 for questionnaire, 0.79 for observation checklists.

**II-Operational Design:** It includes preparatory phase, pilot study and field work.

### **Preparatory Phase:**

During this phase, a review of the literature covering various aspects of the research problem was done by using available articles, periodicals, magazines, and books to be acquainted with the research problem to develop the study tools and content.

### **Pilot study:**

A pilot study was carried out involving eight nurses and six children of the total study sample to test the validity and reliability of the study tools, time needed to fill in, study tools applicability and feasibility. Modifications were done as revealed from the pilot study by adding or omitting some items to avoid duplication of questions, and then all nurses involved in the pilot study were excluded later from the study sample.

### **Ethical consideration:**

Informed consent was obtained from the Ethical Committee before starting the study, an official permission letter was obtained from the

Dean of Nursing Faculty Ain Shams University to directors of the previously mentioned setting. The researcher was explained the objective and aim of the study to subjects included the study. The researcher was assured that no harm will occur. Subjects was informed that they were allowed to choose to participate or not in the study and they have the right to withdraw from the study at any time. The researcher was assured maintain anonymity and confidentiality of subjects' data, the study subject was secured. Subjects consent was obtained to participate or not in the study and they have the right to withdraw from the study at any time.

### Field Work:

The actual field work was carried out over a period of 3 months from beginning of May up to the end of July 2019. The researchers were available in the study setting 3 days/week from 9.00 a.m. to 3.00 p.m.; the researcher was using the constructed tools in collecting the data about nurses' knowledge and practices related to care of children with cardiac surgery. The purpose of the study and its expectations were explained by the researcher to the studied nurses before starting interviewing and data collection. The questionnaire was filled in by the nurses; the time needed to fill in the questionnaire depended on nurses' knowledge, the average time ranged between 30: 45 minutes. The observation checklist was filled in by the researcher during observation of nurses' practices and the time needed to filling in the checklist depended on nurses' own practices of the procedures, each procedure time ranged between 3 to 5 minutes.

**Statistical analysis:** The collected data were organized, revised, scored, tabulated and analyzed using the number and percentage distribution. Statistical analysis was done by computer using statistical package for social sciences (SPSS). Qualitative variables were compared using Chi-square test and quantitative variables were compared using Pearson correlation coefficient ( $r$ ) for continuous parametric variables, and Spearman rank correlation for ordinal nonparametric variables. The significance of the results was considered as follows: When  $P > 0.05$ : it is a statistically

insignificant difference, while  $P < 0.05$  and  $P < 0.001$ : it is a statistically significant difference.

### Results

Regarding the characteristics of the studied sample, **table (1)**, clarified that, half (50%) of studied nurses enrolled in this study aged from 25 to less than 30 years, with the mean age was  $26.84 \pm 7.01$  years and mean years of experience of them was  $7.98 \pm 4.49$ . The same table represented that, almost less than two third (61.7) of nurses was Staff Nurse, and less than one third (31.7%) of them had Technical Institute.

As regards to characteristics of the studied children, **table (2)** showed that, 50.9% of the studied children were less than 4 years and less than two thirds of them (60.4%) were male. Also, this table showed that less than three quarters (71.7%) of studied children from rural. According to patient's diagnosis **figure (1)** showed VSD (ventricular septal defects) was the most common diagnosis (28.3%) followed by PDA (22.7%).

**Table (3)** revealed that less than one third of the studied nurses had satisfactory knowledge regarding anatomy and physiology of heart, and oxygen Therapy (31.7%, 28.3% respectively). While more than half of them had satisfactory knowledge regarding nursing care for a child's ventilator, and central venous catheter (55%, 56.7% respectively).

Regarding the satisfactory level of total knowledge, **figure (2)** showed that less than two thirds (65%) of the studied nurses had unsatisfactory knowledge, while the rest of them had satisfactory knowledge.

**Table (4)** revealed that more than half of the studied nurses had competent performance in relation to assessment of vital signs, use of pulse oximetry and chest tube care (53.3%, 51.7%, and 53.3% respectively). While, only more than one third of them had competent performance regarding central venous pressure assessment, care of urinary catheter and oxygen therapy (40%, 41.7% and 38.3% respectively).

Regarding the competent level of total performance, **figure (3)** showed that more than half (53.3%) of studied nurses were incompetent. While less than half (46.7%) of the study subjects had a competent level of total performance.

Regarding the correlation between nurses' total knowledge and their performance, **table (5)** reflected that there was statistical significant difference between total knowledge of the studied nurses and their performance ( $P$  value  $< 0.05$ ).

**Table (1): Distribution of the studied nurses according to their characteristics (n= 60).**

| Items                           | N.                                 | %           |
|---------------------------------|------------------------------------|-------------|
| <b>Age in year</b>              |                                    |             |
| 25 < 30 years                   | 30                                 | 50          |
| 30 < 35 years                   | 23                                 | 38.3        |
| 35 years and more               | 7                                  | 11.7        |
| <b>Mean <math>\pm</math> SD</b> | <b>26.84 <math>\pm</math> 7.01</b> |             |
| <b>Gender</b>                   |                                    |             |
| Male                            | 19                                 | 31.7        |
| Female                          | 41                                 | 68.3        |
| <b>Job Position</b>             |                                    |             |
| Staff Nurse                     | 37                                 | <b>61.7</b> |
| Nurse Practitioner              | 15                                 | 25          |
| supervisor Nurse                | 8                                  | 13.3        |
| <b>Marital status</b>           |                                    |             |
| Single                          | 33                                 | 55          |
| Married                         | 25                                 | 41.7        |
| Divorced/widow                  | 2                                  | 3.3         |
| <b>Qualification</b>            |                                    |             |
| Diploma                         | 17                                 | 28.3        |
| Diploma & specialist            | 7                                  | 11.7        |
| Technical Institute             | 19                                 | <b>31.7</b> |
| Bachelor                        | 12                                 | 20          |
| Bachelor & diploma              | 5                                  | 8.3         |
| <b>Years of Experience</b>      |                                    |             |
| Less than 5years                | 17                                 | 28.3        |
| 5 to less than 10 years         | 32                                 | 53.3        |
| 10 to less than 15 years        | 6                                  | 10          |
| 15 and more                     | 5                                  | 8.3         |
| <b>Mean <math>\pm</math> SD</b> | <b>7.98 <math>\pm</math> 4.49</b>  |             |

**Table (2): Distribution of studied children according to their characteristics (n= 53).**

| Items                           | N.                                | %           |
|---------------------------------|-----------------------------------|-------------|
| <b>Age/ years</b>               |                                   |             |
| Less than 4 year                | 27                                | <b>50.9</b> |
| 4 > 8 years                     | 12                                | 22.6        |
| 8 $\geq$ 12 years               | 14                                | 26.4        |
| <b>Mean <math>\pm</math> SD</b> | <b>4.91 <math>\pm</math> 3.42</b> |             |
| <b>Gender</b>                   |                                   |             |
| Male                            | 32                                | <b>60.4</b> |
| Female                          | 21                                | 39.6        |
| <b>Area</b>                     |                                   |             |
| Rural                           | 38                                | <b>71.7</b> |
| Urban                           | 15                                | 28.3        |

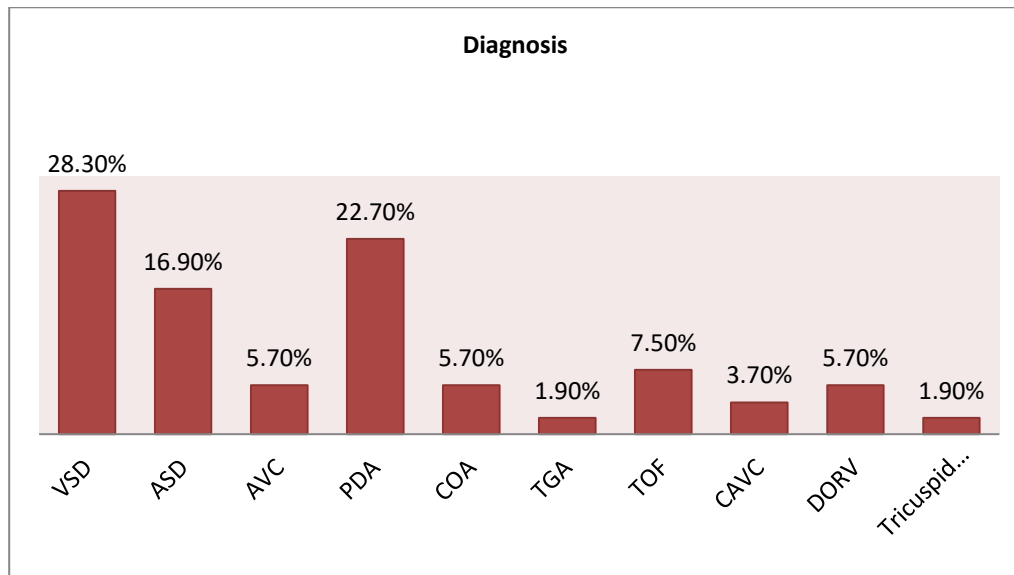


Figure (1): percentage distribution of studied children according to their medical diagnosis.

Table (3): Distribution of the Studied Nurses According to Their Satisfactory Knowledge about Postoperative Care of Children with Cardiac Surgery (n= 60).

| Items   | Unsatisfactory                  |      | Satisfactory |      |
|---|---------------------------------|------|--------------|------|
|   | N                               | %    | N            | %    |
|   | Anatomy and physiology of heart | 41   | 68.3         | 19   |
| Congenital heart defects  | 35                              | 58.3 | 25           | 41.7 |
| Knowledge about heart surgery                                   | 33                              | 55   | 27           | 45   |
| Knowledge about postoperative nursing care of heart surgeries.  | 30                              | 50   | 30           | 50   |
| Nurses' information about nursing care for a child's ventilator | 27                              | 45   | 33           | 55   |
| Nurses' Information on Oxygen Therapy                           | 43                              | 71.7 | 17           | 28.3 |
| Nurses' information about chest tube care                       | 36                              | 60   | 24           | 40   |
| Nurses' information regarding CPR.                              | 39                              | 65   | 21           | 35   |
| Nurses' information about the central venous catheter           | 26                              | 43.3 | 34           | 56.7 |

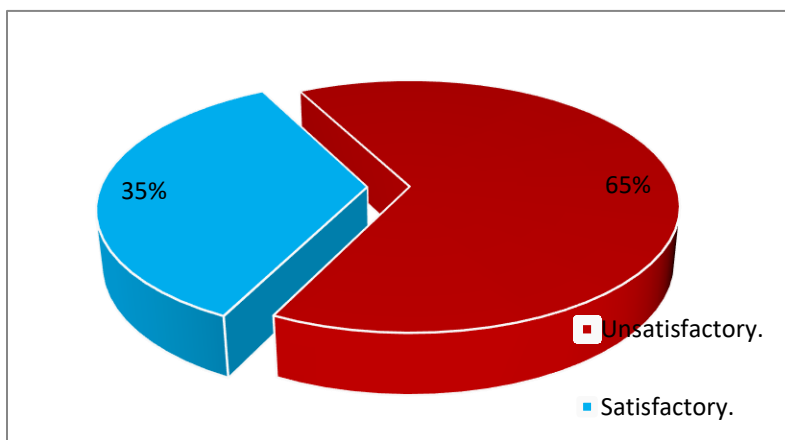
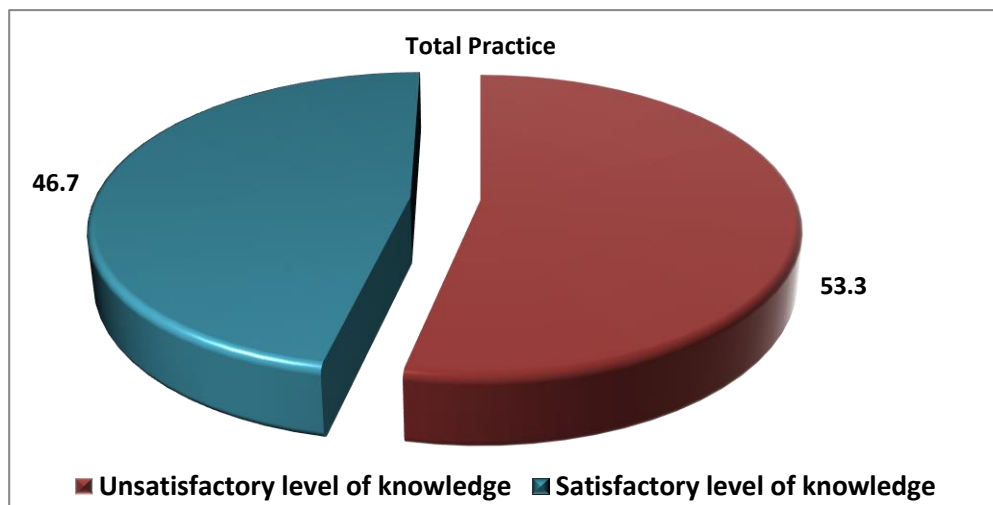


Figure (2): Distribution of the Studied Nurses According to Their Total Knowledge about Postoperative Care of Children with Cardiac Surgery.

**Table (4): Distribution of the Studied Nurses According to their Adequate Practices of all Items Related to Postoperative Care of Children with Cardiac Surgery (n=60)**

| Items                    | Total number = 60 |      |           |      |
|--------------------------|-------------------|------|-----------|------|
|                          | Incompetent       |      | Competent |      |
|                          | No.               | %    | No.       | %    |
| Assessing Vital Signs    | 28                | 46.7 | 32        | 53.3 |
| Use a Pulse Oximetry     | 29                | 48.3 | 31        | 51.7 |
| Central venous pressure. | 36                | 60   | 24        | 40   |
| Nasopharyngeal suction.  | 31                | 51.7 | 29        | 48.3 |
| Wound Dressing           | 31                | 51.7 | 29        | 48.3 |
| care of Urinary Catheter | 35                | 58.3 | 25        | 41.7 |
| Chest tube care.         | 28                | 46.7 | 32        | 53.3 |
| Oxygen therapy care      | 37                | 61.7 | 23        | 38.3 |

**Figure (3): Distribution of the studied nurses according to their total practices regarding post-operative care of children with cardiac surgery.****Table (5): Correlations between Nurses' Total Knowledge and Total Practices Regarding Post-Operative Care of Children with Cardiac Surgery (n=60).**

| Total performance   | Total knowledge            |      |                          |      |
|---|----------------------------|------|--------------------------|------|
|   | Unsatisfactory<br>No. (39) |      | Satisfactory<br>No. (21) |      |
|   | No.                        | %    | No.                      | %    |
| <b>Incompetent.</b>                                       | 31                         | 79.5 | 1                        | 3    |
| <b>Competent.</b>   | 8                          | 28.6 | 20                       | 71.4 |
| <b>X<sup>2</sup> : 6.88      P &lt; 0.05*      DF : 1</b> |                            |      |                          |      |

\*Statistical significant difference

## Discussion

Cardiac surgery may be necessary to correct a congenital defect or to provide symptomatic relief. Surgical procedures seek to repair the defect as much as possible and restore the circulation to as close to normal as possible. The surgery may be planned as an elective

procedure or done on emergency basis (Kimberly et al., 2017).

Nurses are responsible for a complex performance that implies a certain set of knowledge and practice and need a deep understanding of nursing priorities for pediatric cardiac patients. Knowledge and evidence-based practice are important to ensure the best

performance in the nursing sector. The nursing protocol is a method for teaching nurses and designed for the independent education as an attempt to avoid any strains for acquired new information at any time. Moreover, it has a positive effect on nurses' knowledge, performance and improved quality of nursing care (**Potter & Perry, 2017**).

As regarding characteristics of the studied nurses, The finding of the current study revealed that, half of the studied nurses were in the age group 25 > 30 years with the mean age was  $26.84 \pm 7.01$ . This finding was in agreement with those of **Abdel- Razeq et al., (2020)**, who recently conducted a study entitled "Effectiveness Of Early Warning Sign's Detection Educational Sessions For Nurses On Clinical Outcomes Of Post Open Cardiac Surgery Children" and found that, over a third of the studied nurses belonged to the age group between 20 and less than 30 years.

As regarding characteristics of the studied nurses, the results of the present study revealed that, more than half of the studied nurses had 5 > 10 years of experience with a mean year of experience  $7.98 \pm 4.49$ . Moreover, less than one third of the studied nurses held Secondary Nursing Education.

These results were in agreement with that of **Eskandeer et al., (2013)**, who studied "Intensive Care Nurses' Knowledge & Practices regarding Infection Control Standard Precautions at a Selected Egyptian Cancer Hospital" and found that, more than half of the nurses had more than five years of experience. The finding was in line with **Bayomi (2020)** who conducted a study entitled " Permanent pacemaker implantation: Effect of intervention protocol on nurse's knowledge, practices, and patient's outcomes." and concluded that concerning level of education about half of them had diploma degree.

Meanwhile, These findings were in disagreement with **Thabet, et al. (2019)** who found in thesis entitled " Assessment of Nurses' Knowledge and Practices Regarding Temporary Pacemaker Patient's Care at Assuit University Hospital in Egypt," that the majority of nurses had ages ranging from 18 to 23 years and more

than half of them were certified from nursing institute.

As regards characteristics of the children under study, results revealed that more than half of the studied children were less than 4 years. This finding was in agreement with those of **Abdel- Razeq et al., (2020)**, who mentioned that, less than one third of the studied children's were in the age group from 3 to 6 years of age. Meanwhile, this finding was dispute with **Morsi (1997)**, who conducted a study, entitled "The effect of preoperative instructions of the postoperative outcomes for children undergoing heart surgery" and reported that, the age of children was 7 to 16 years old.

The results of the current study revealed that, less than two thirds of children were males. This was supported by **Badri (2015)**, who found in a study entitled "Effect of Nursing Intervention on Stressors and Coping Patterns of Children Undergoing Cardiovascular Surgeries and their Caregivers" that, less than two thirds of the studied children were males. On the other hand, this was incongruent with that of **Ujuanbi (2016)**, who performed a study entitled "Prevalence of Congenital Heart Diseases among Primary School Children in the Niger Delta Region of Nigeria, West Africa" revealed that more than half of children were females. These results might be due to the differences in the study settings.

Concerning the residence of studied children, the findings of the present study clarified that, less than three quarters of studied children were living in rural areas. This was corresponding with those of **Badri (2015)**, who reported that, more than half of both study and control groups were living in rural areas. On the same context, this was parallel with **Mahmoud et al., (2020)**, who found in a recent study entitled "Quality of life among Children with Congenital Heart Diseases" that, the highest percent of studied children were from rural area. It could be explained by that, the hospitals in rural areas are not well prepared to carry out this type of surgeries.

Concerning the medical diagnosis, VSD (ventricular septal defects) was the most



common diagnosis which represents slightly more than one quarter of the studied children.

This was highly supported by **Abd El Samiea (2011)**, who conducted a study entitled "Nurses' Performance Regarding Care of Children Undergoing Cardiac Surgery" and stated that, about more than one third of the studied children had VSD. Also, these results were parallel to that of **Lemanu et al., (2013)** who found in a study entitled "The effect of preoperative exercise on cardio-respiratory function and recovery after surgery" that cardiac disorders specially VSD, were the second cause of children's admission to the hospital in the USA. In the same context, this was matched with **Badri (2015)**, who cleared that, less than one third of the study group and less than one quarter of the control groups had VSD.

The current results showed PDA was the second most common type of CHD after VSD which represent less than one quarter. Meanwhile, this was incongruent with **Catta (2009)**, who carried out a study entitled "the essentials in the postoperative evaluation of congenital heart disease" and stated that, Fallots tetralogy was the second most common type of CHD between preschool and school children in London. These results might be due to the differences in the sample size, patient's characteristics and disease prevalence.

The current study revealed that TGA represented relatively low percentages of CHD. Similarly, **Connolly, (2010)** conducted a study entitled "Postoperative Complication in Children after Cardiac Correction for Congenital Heart Disease" and reported that, TGA were less common between school children in USA.

Considering the nurses' knowledge regarding anatomy and physiology of heart, the results of the current study indicated that less than third of the studied nurses had satisfactory knowledge. This was similar to **Badri (2015)**, who cleared that third of the studied subjects had a good knowledge before application of the program. On the same context, **Mostafa et al., (2017)**, who carried out a study entitled "Effect of Training Program Regarding Care of Patients Undergoing Open Heart Surgery on Nurses' Performance Approach" revealed that, more

than half of them had unsatisfactory knowledge at pre phase of the training program.

Regarding the studied nurses' knowledge about heart surgery, more than half of the studied nurses had unsatisfactory knowledge. This was in agreement with **Mostafa et al. (2017)**, who revealed that, more than half of the studied nurses in pretest had unsatisfactory knowledge regarding open heart surgery.

Concerning the nurses' knowledge regarding nursing care of children connected with mechanical ventilation, more than half of the studied nurses had satisfactory knowledge. In the same line **Shehab et al., (2018)**, conducted a study entitled "Nurses Performance about Safety Weaning from Mechanical Ventilation of Critically Ill Adults and Children" and concluded that more than half sector of the studied nurses had inadequate knowledge and practice regarding mechanical ventilation of critically patient at intensive care units.

Considering the nurses' knowledge about Cardio Pulmonary Resuscitation (CPR), less than one quarter of studied nurses had satisfactory knowledge. This result was in accordance with **Randa et al., (2020)**, who found, in a recent study entitled "Effect of Educational Protocol about Resuscitation Process on Nurses' Performance" that, more than two third of studied sample had unsatisfactory knowledge during pre-education.

Regarding the satisfactory level of total knowledge, the current study showed that, about less than two thirds of the study nurses had a unsatisfactory level of total knowledge about Postoperative care of children with cardiac surgery while the slightly more than third of the them had an unsatisfactory level of total knowledge. This result was parallel to **Hafez (2014)**, who found that, most of the studied subject had insufficient knowledge before the program implementation.

This lack of knowledge may be due to that, there was around one third of the studied nurses have less than 5 years of experience. Moreover, there was no center or source for acquiring knowledge. This would affect

negatively on the nursing care provided for children. Additionally, it might lead to complications among the children and might lead to several problems to the nurse providing the care.

Regarding the studied nurses' practices about postoperative care of children with cardiac surgery, the results of the current study showed that, more than half of the studied nurses had competent practice in measuring vital signs, This was similar to **Mohamed et al., (2020)**, who found, in a recent study entitled "Impact of Nursing Intervention Protocol about Polytrauma Care during the Golden Hour on Nurses' Performance" that, more than half of the studied nurses had satisfactory practice level.

More than half of the studied nurses had competent practice regarding naso/oropharyngeal suctioning. The study result was parallel to that of **Ragab, (2017)** whose study entitled "The effect of instructional guidelines in neonatal nurses' performance caring of neonates suffering from Meconium Aspiration." and proved that about more than half of the studied nurses were competent practice in suction.

Regarding nurses practice throughout using oxygen therapy, the result of present study showed that about more than one third of the studied nurses achieved competent practice in oxygen therapy. This was argument with **Ben et al., (2009)** who mentioned that, the majority of study sample were competent skills about oxygen therapy. These results might be due to the differences in the samples' size.

Regarding the competent level of total practice, the current study showed that, more than half of studied nurses had incompetent according to their total performance about postoperative care of children with cardiac surgery. While less than half of the study subjects had a competent level of total performance.

The incompetent practices might be due to the absence of a training program, booklet and stander for care inside unit. In the same line **Khalil (2018)** reported that this might be related

to many factors as nursing workload, lack of availability of assessment tools, lack of education on assessment tools, lack of familiarity with tools, lack of protocols and guidelines management and no designing area for charting. This was agreed with **Mohammed et al., (2018)** who showed that the practice score of nurses exposed to an educational program was higher than their pre practice score.

Regarding the Relation between nurses' total knowledge and their practices regarding Postoperative Care of Children with Cardiac Surgery, the results reflected that there was Statistical significant difference ( $P < 0.05$ ) between total knowledge of the studied nurses and their performance. Where the more than of three quarters of the studied nurses who were incompetent had unsatisfactory knowledge, while less than three quarters of studied nurses who were competent had satisfactory knowledge. This result was in the same line with **Mostafa et al., (2017)**, and **Malek, 2013**, who stated that, there was positive correlation between nurses' knowledge and their practice. However, this result disagrees with **Marouf, et al., (2012)**, who stated that, there was no statistically significant correlation between nurses' knowledge and practice.

## Conclusion

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More than third of the studied nurses had satisfactory knowledge about postoperative care of children with cardiac surgery and less than half of them had a competent level of total practices. Moreover, there were significant correlations between nurse's' knowledge and practices

## Recommendations

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Continuous educational training programs should be organized for the nurses especially newly joined nurses to improve their knowledge and practice regarding cardiac surgery.

Development of a policy and procedure leaflet for nurses who provide care for children undergoing cardiac surgery is important.

Designing and carrying out programs to support the children with congenital heart disease and their families to cope with disease.

Continuous evaluation and monitoring follow up care for the children undergoing cardiac surgery.

**Ethical Clearance:** Institutional ethical committee obtained for the study.

**Source of Funding:** self

**Conflict of Interest:** None

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