

## Assessment of Nurses' Performance in Care of Children with Critical Cardiac Conditions

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### abstract

**Background:** Pediatric cardiac critical care nursing plays a central role in the care of pediatric patients with complex congenital, acquired and critical heart condition. **Aim:** This study aimed to assess nurses' performance in care of children with critical cardiac conditions. **Research design:** A descriptive research design. **Settings:** This study was conducted at the Pediatric Intensive Care Unit at Cardiothoracic and Vascular Academy affiliated to Ain Shams University Hospitals and Bahtem hospital for specialist surgeries affiliated to Health Insurance. **Subject:** A convenience sample of 59 nurses who were working at the previously mentioned study settings. Tools: A pre-designed interview questionnaire sheet, observational checklists and attitude Likert type rating scale to assess nurses' performance in the care of children with critical cardiac conditions. **Results:** More than one quarter of the studied nurses had satisfactory knowledge, less than two fifths of them had satisfactory practice and more than one third of them had a negative attitude regarding the care of pediatric patients with critical cardiac conditions. **Conclusion:** More than half of the studied nurses had an adequate performance regarding the care of the children with critical cardiac conditions. **Recommendations:** Periodic assessment of nurses' performance in the care of children with critical cardiac conditions and provide appropriate nursing intervention based on their actual educational needs assessment.

**Key words:** Critical Cardiac Conditions, Nurses Performance.

### Introduction:

Heart diseases in pediatric patients are life threatening events; that affects the child's health and family. Heart diseases are acquired or congenital. Congenital heart defects (CHDs) are structural problems with the heart present at birth and result when a problem occurs during heart development soon after conception; usually occurs during the first 8 to 12 weeks of gestation (*James et al., 2014*).

Most alterations in cardiovascular function in children are the result of defects in the heart that are present at birth as CHD. Defects range in severity from simple problems, such as different types of septal defects between chambers of the heart, to very severe malformations, such as complete absence of one or more chambers or valves (*Leifer, 2018*).

According to *Lozano (2012)*, congenital heart diseases are the most common neonates congenital disorder. A congenital heart defect is a defect in the structure of the heart and great

vessels which is present at birth. Many types of heart defects exist, most of which either obstruct blood flow in the heart or vessels near it or cause blood to flow through the heart in an abnormal pattern.

The estimated prevalence was 4 to 50 per 1000 live births more than 2 million Americans living with a CHD. Approximately 8 out of every 1,000 newborns have CHDs, which can range from mild to severe. In Egypt, the incidence of congenital heart disease is ranged from 7 to 8 children/1000 lives birth (*American Heart Association, 2015*).

Pediatric cardiac critical care nursing plays a central role in the care of patients with complex congenital and acquired heart disease. The role of nurses is to provide information regarding the disease, its treatment, prognosis and complication, also adjusting the child emotional as well as physical reactions to illness and hospitalization (*Brown et al., 2019*).

High quality of nursing care for children in Pediatric Intensive Care Units (PICU) demands professional nursing knowledge and practical skills, due to its specificity and complexity. Nurses must be knowledgeable about the human responses of children where many of their responses are physiological, yet there is a multitude of psychosocial, behavioral and family responses that are also very important for the nurses to understand, diagnose and treat (*Cavalcante et al., 2015*).

### **Significance of the Study:**

Congenital heart diseases (CHDs) cover a wide spectrum from small defects, which may be totally asymptomatic and compatible with a normal lifespan to more severe forms which require urgent intervention. Many defects are possible, but most defects either obstruct flow of blood in the heart or in the vessels near to it or cause blood to take an abnormal way through the heart. Knowledge about congenital heart disease, its treatment, complications and risk factors for critical cardiac conditions may optimize treatment and reduce incidence of complications (*Azhar et al., 2016*).

Pediatric nurses have a challenging role in providing nursing care for children. This requires a developmentally appropriate care and diligence in the assessment of the pediatric patient. Nurses providing direct patient care at the bedside spend the most time with patients across health care providers and therefore, may be first to recognize subtle dysmorphic features in infants and children with congenital heart diseases (CHDs). The professional practices of nursing within the pediatric environment can be both rewarding and challenging. Pediatric nurses' activities are complicated and require constant vigilance in providing quality care for pediatric patients (*Essani & Ali, 2016*).

### **Aim of the study:**

This study aims to assess nurses' performance in care of children with critical cardiac conditions.

### **Research questions:**

1. What is the nurses' level of knowledge in care of pediatric patient with critical cardiac conditions?
2. What is the nurses' practice in care of pediatric patient with critical cardiac conditions?
3. What is the nurses' attitude in care of pediatric patient with critical cardiac conditions?

### **Subjects and Methods**

#### **1. Technical Design**

- **Research design:** A descriptive design was utilized for conducting this study.

- **Research Settings:** This study was conducted at the Pediatric Intensive Care Unit (PICUs) at Cardiothoracic and Vascular Academy affiliated to Ain Shams University Hospitals and Bahtem Hospital for Specialist Surgeries affiliated to the General Authority For Health Insurance.

- **Study subject:** A convenience study sample was employed; it included 59 nurses who were working on the pediatric critical care units in the previously mentioned settings during the study period, regardless of their characteristics.

#### **Tools of data collection:**

##### **Tool (I): Nurses' pre-designed interview questionnaire**

It was designed by the researcher in simple Arabic language to suit the understanding level of the studied nurses after reviewing the recent and relevant literature (*Srisomboon, (2010), Aziz & yonis (2013), Tibbles et al., (2013), Van et al., (2017)*). It consisted of the following parts:

##### **Part I:**

This part was concerned with characteristics of study subject including:

- Characteristics of the studied nurses including age, gender, qualifications, years of experience, material status and previous training courses.

- Characteristics of the studied children, including age, gender, medical diagnosis and duration of hospitalization.

### Part II:

This part was concerned with nurses' knowledge regarding care of children with critical cardiac conditions and included 83 questions (anatomy & physiology of the heart, types of pediatric congenital heart diseases, causes, clinical Picture and complication of pediatric critical heart diseases, nursing intervention at pediatric intensive care unit, cardiac drugs, concept of pain, arterial line indications & care of mechanical ventilation, oxygen therapy, nebulizer, chest tube indications and its nursing care, central venous catheter indications, signs of cardiopulmonary arrest, aim of CPR and nursing care after CPR).

### Tool (II): An observational checklist:

The observational checklists were adopted from *Trigg et al., (2010)* and *Pamela & Maril, (2011)*, and were used to assess actual nursing practices regarding the care of children with critical cardiac conditions. It consisted of nine observational checklists related to critical cardiac conditions (namely; respiratory hygiene including performing hand washing (11steps), endotracheal tube insertions (13 steps), endotracheal tube suction (18 steps), nasopharyngeal suction (18 steps), routine care in PICU including connecting cardiac monitor (11 steps), measuring central venous pressure (12 steps), care of arterial line (22 steps) & post-operative care including wound care (28 steps) & management of underwater seal drainage (11 steps)).

### Tool (III): Attitude Rating Type Scale:

It was designed by the researcher after reviewing the related literature *Tantawi et al., (2015)*, *Al-Fatlawi, & Ahmed, (2016)* and *Fath-Allah, (2017)*. It consisted of 24 statements to assess nurses' attitude regarding the care of children suffering from critical cardiac conditions. The studied nurses were asked to respond on 3-points Likert scale. The statements were divided into "6" statements to assess nurses' attitude regarding pediatric patient with a critical cardiac conditions, "7" statements to assess nurses' attitude regarding

hospital & work colleagues, "6" statements to assess nurses' attitude regarding pediatric patient' family and "5" statements were stated to assess nurses' attitude regarding routine care provided to pediatric patient with a critical cardiac conditions.

## 2.Operational Design:

### A. Preparatory phase:

It included reviewing of related literature using textbooks, journals, scientific periodicals and web-sites was conducted to develop the study tools and to get acquainted with the various aspects of the research problem.

### B. Pilot Study:

A Pilot study involved six nurses (10% of the total sample size) to test the clarity, applicability, feasibility & relevance of the tools used and to determine the needed time for data collection by using the study tools. After analyzing results of a pilot study, the necessary modifications were done. Finally the nurses involved in the pilot study were excluded from the study sample later.

### C. Validity and reliability:

The tools were revised by a jury of three experts from different academic categories (professors and assistant professors) of the pediatric nursing department's staff at the Faculty of Nursing, Ain Shams University. The jury reviewed the tools (its validity for comprehensiveness, accuracy, clarity and relevance). The internal consistency of the developed tools was tested for their reliability using Cronpach's alpha coefficient test by a statistician to assess reliability of the tools; the tool (I) was reliable as  $r = 0.82$ , and tool (II) was reliable as  $r = 0.84$ .

### D. Field work:

The actual fieldwork was carried out over a period of six months starting from the first of May to the end of October 2019. At the beginning, the researcher introduced herself to the studied nurses and explained the purpose of the study to gain their cooperation and to assure the studied nurse about the anonymity of their answers and that the information will be used

for scientific research only and was being strictly confidential.

The data collected through interview and observation of the nurses individually to identify background information and evaluate their performance. The collection of data was conducted three days per week. The researcher was available two days/week (Sunday and Monday) at Cardiothoracic and Vascular Academy and one day weekly (Wednesday) at Bahtem hospital for specialist surgeries in throughout morning and afternoon shifts during providing direct care to the pediatric patients. The average time required to complete each questionnaire and attitude sheet was 30 minutes.

The studied nurses were observed and evaluated for the actual care provided to the children suffering from critical cardiac conditions by the observation checklists which filled by the researcher.

### 3- Administrative Design:

An official letter requesting permission to conduct the study was submitted from the dean of Faculty of Nursing- Ain Shams University to the director of each previously mentioned study setting to collect the necessary data for the current study. The letter included the aim of the study in order to get permission and help for collection of data. The necessary approval was obtained from the unit's directors.

### Ethical considerations:

The research approval was obtained from the scientific research ethical committee affiliated to Faculty of Nursing - Ain Shams University before starting the study. The pediatric nurses assured that the collected data would be treated confidentially and that it would be used for the purpose of the study only. The purpose of the study was simply explained to the nurses who agree to participate in the study prior to data collection. The researcher assured maintaining anonymity and confidentiality of the subject data. Pediatric nurses were informed that they allowed to withdraw from the study at any time without giving any justification.

### 4- Statistical Design

Data collected from the studied sample were revised and coded. Data entry and statistical analysis were fulfilled using the Statistical Package for Social Sciences (SPSS) software version 20. The obtained data were organized, tabulated, analyzed and represented in tables and graphs as required. Data were presented using qualitative statistics in the form of frequencies, percentages, means, standard deviation (SD), chi-square ( $\chi^2$ ) and correlation coefficient (r).

Level of significance was accepted at P value:

- Non significant difference  $> 0.05^*$
- Significant difference  $< 0.05^*$
- High statistical significant difference  $< 0.001^*$

### Results:

**Table (1):** showed that, more than half (56%) of the studied nurses were in the age group of  $25 < 30$  years ( $\pm$ SD  $29.18 \pm 5.22$  years). The majority (86.4%) of them were females. Also, nearly three quarters (72.9%) of them were technical nursing institute diploma graduates, it was found that two thirds (66.1%) of them their years of experience were less than 5 years and less than two thirds (61%) of them were married.

**Figure (1):** illustrates that, only more than a quarter (28.8%) of the studied nurses had a satisfactory level of knowledge regarding the care of pediatric patients with critical cardiac conditions and less than three quarters (71.2%) of them had an unsatisfactory level of knowledge.

**Figure (2):** represents that, only less than two fifths (37.3%) of the studied nurses had satisfactory total practices regarding the care of pediatric patients suffering from critical cardiac conditions and less than two thirds (62.7 %) of them had unsatisfactory total practices.

**Figure (3):** illustrates that, only more than sixth (16.9%) of the studied nurses had a positive attitude regarding the care of pediatric patients with critical cardiac conditions, while nearly half (49.2%) of them had an indifferent attitude and about a third (33.9%) had a negative attitude.

**Figure (4):** represents that, more than half (54.2%) of the studied nurses had an

adequate total performance regarding the care of pediatric patients with critical cardiac conditions, and 45.8% of them had an inadequate total performance.

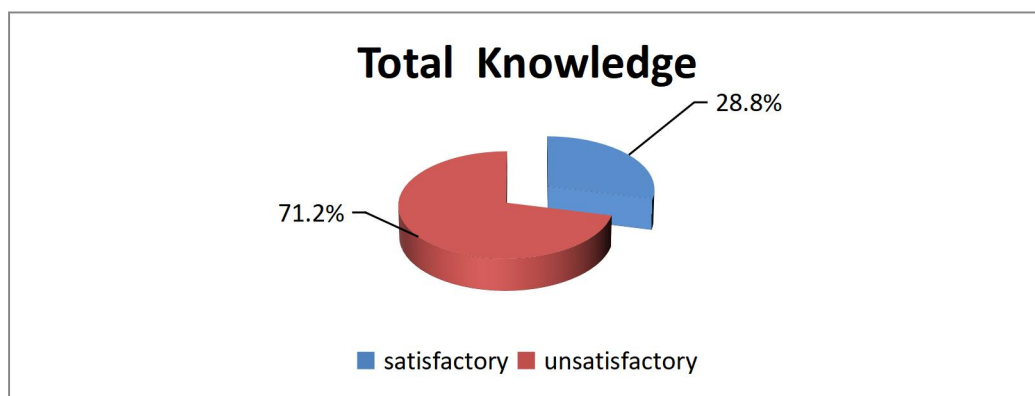
**Table (2):** reveals that, there was significant statistical difference between studied

nurses' total performance and nurses' qualifications at p-value of 0.046.

**Table (3):** reveals that, there was a positive correlation between nurses' performance and their knowledge, practice & attitude at p-value 0.000, 0.000, 0.000 respectively.

**Table (1):** Distribution of the Studied Nurses, according to their Characteristics (n=59).

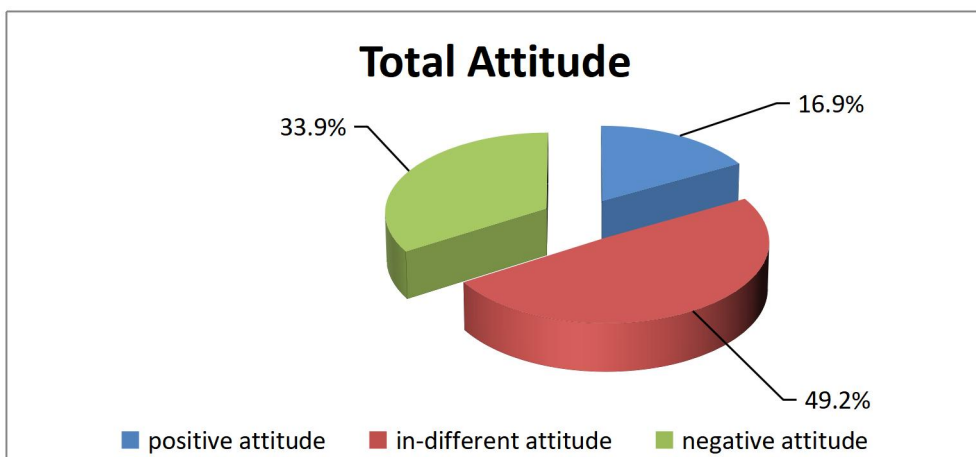
Nurses' Characteristics	Number (No =59)	Percentage (%) =100
	No	%
<b>Age in years</b>		
20: < 25	11	18.6
25: < 30	33	56
30: < 35	9	15.2
35: ≤ 40	6	10.2
	$\bar{X} \pm SD$	29.18±5.22
<b>Gender</b>		
Male	8	13.6
Female	51	86.4
<b>Qualifications</b>		
Technical Nursing School	7	11.9
Technical Nursing Institute	43	72.9
Bachelor in Nursing Science	9	15.2
<b>Years of experience at pediatric critical cardiac care unit</b>		
< 5	39	66.1
5: < 10	13	22
10: ≤ 15	7	11.9
	$\bar{X} \pm SD$	3.85±1.75
<b>Marital status</b>		
Single	21	35.6
Married	36	61
Widow	2	3.4



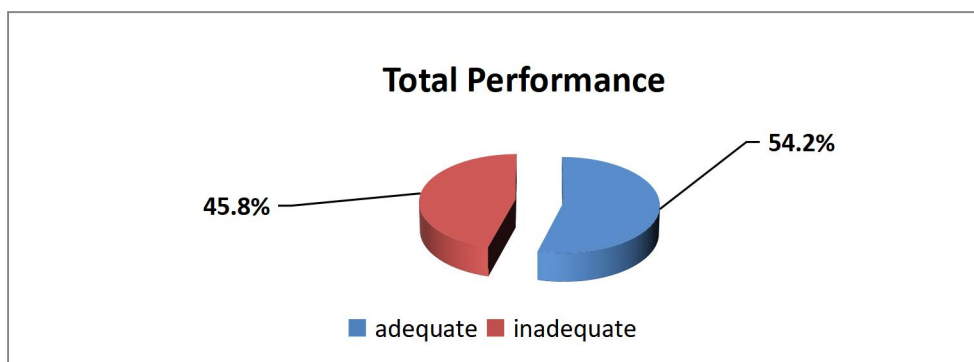
**Figure (1):** Distribution of the Studied Nurses' Total Knowledge regarding Care of Pediatric Patients with Critical Cardiac Conditions (n=59).



**Figure (2):** Distribution of the Studied Nurses' Total Practice regarding Care of Pediatric Patients with Critical Cardiac Conditions (n=59).



**Figure (3):** Distribution of the Studied Nurses' Total Attitude regarding Care of Pediatric Patients with Critical Cardiac Conditions (n=59).



**Figure (4):** Distribution of the Studied Nurses' Total Performance regarding the Care of Pediatric Patients with Critical Cardiac Conditions (n=59).

**Table (2):** Relation between the Studied Nurses' Characteristic & their Total Performance regarding Care of Pediatric Patients with Critical Cardiac Conditions (n=59).

Nurses' characteristics	Nurses' Total Performance				Chi-square	
	Adequate		Inadequate		$\chi^2$	P value
	No	%	No	%		
<b>Age in years</b>						
20: < 25	5	8.5	6	10.2	6.583	0.086
25: < 30	19	32.2	14	23.7		
30: < 35	1	1.7	8	13.6		
35: ≤ 40	2	3.3	4	6.8		
<b>Gender</b>						
Male	5	8.5	3	5.1	3.187	0.074
Female	21	35.6	30	50.8		
<b>Qualifications</b>						
Technical Nursing School	2	3.3	5	8.5	2.004	<b>0.046*</b>
Technical Nursing Institute	21	35.6	22	37.3		
Bachelor in Nursing Science	6	10.2	3	5.1		
<b>Years of experience at pediatric critical cardiac care unit</b>						
<5	19	32.2	20	33.9	0.440	0.802
5: <10	5	8.5	8	13.6		
10: ≤15	2	3.3	5	8.5		
<b>Marital status</b>						
Single	10	16.9	11	18.6	0.069	0.966
Married	16	27.1	20	34		
Widow	1	1.7	1	1.7		
<b>Training courses</b>						
Yes	11	18.6	11	18.6	0.254	0.614
No	17	28.8	20	34		

**Table (3):** Correlation between Total Nurses' performance & Nurses' Knowledge, Practice, Attitude regarding Care of Pediatric Patients with Critical Cardiac Conditions (n=59).

Parameters	Nurses' Total Performance	
	r	P value
Nurses' knowledge	.796**	.000
Nurses' practice	.838**	.000
Nurses' attitude	.545**	.000

>0.05 Non significant <0.05\* significant <0.001\*\* High significant

## Discussion

Pediatric cardiology nurses should clearly understand the nature of pediatric heart diseases including cardiac structure, pathophysiology and major pediatric cardiac diseases. This would make them deeply understand and provide better and holistic care to the pediatric patients and their families effectively (Titler, 2011).

As regards the characteristics of the studied nurses (table 1), finding of the current study revealed that, more than half of the studied nurses were in the age group of 25 < 30 years

with ( $\bar{X} \pm SD$  29.18±5.22) years. This finding was supported by the study of Salah Eldien et al., (2017), who carried out a study entitled "Assessment of Nursing Care for Children Undergoing Open Heart Surgery" and found that, the most studied nurse's ages were from 25 to 30 years. This may be due to most of the studied nurses were newly graduated after technical institute of nursing.

Concerning gender of the studied nurses (table 1), finding of the present study showed that, the majority of the studied nurses were females. This finding is in the same line with Hasballah et al., (2019), who conducted a study

entitled "Assess Nurses' Knowledge and Attitude for Patient Safety in Cardiac Catheterization Unit" and found that, the most of the studied nurses were females. This may be due to the greater fraction of the nurses in Egypt was females and most of nursing students in Egyptian universities were exclusively females for till few years ago.

Regarding qualifications of the studied nurses (**table 1**), finding of the present study illustrated that, nearly three quarters of the studied nurses were technical nursing institutes graduates. This finding was in an agreement with the findings of *Mohammed et al., (2020)*, who carried out a study entitled "Nurses' Performance regarding Patient with Permanent Pacemaker in Intensive Care" and mentioned that, three quarters of the studied nurses had technical nursing institute (diploma). This might be due to that a lot of bedside nurses in the governmental hospitals were graduated from nursing school and technical nursing institutes.

Concerning the studied nurses years of experience in pediatric critical cardiac care unit (**table 1**), finding of the present study indicated that, less than two thirds of the studied nurses had ranged from  $1 < 5$  years. This finding is in the same line with *Abusaad et al., (2019)*, who carried out a study entitled "Impact of an Evidence-Based Educational Program about Pediatric Open Heart Surgery Care on both Nurses and Patients' Outcomes" and stated that, a higher proportion of the studied nurses were having less than 5 years of experience. This finding may be due to that most of the studied nurses who are assigned to work in critical units were recently graduated.

As regards the marital status of the studied nurses the finding of the current study (**table 1**), indicated that, more than three fifths of them were married. This finding was in an agreement with *Ibrahim et al., (2017)*, who conducted a study entitled "Effect of Nursing Care Standards on Nurses' Performance in Caring for Patients with Cardiac Arrhythmias" and stated that, the majority of the nurses who working in intensive and CCUs were married.

Concerning the studied nurses total knowledge regarding care of children with critical cardiac conditions the current study finding (**figure 2**), represented that, less than three quarters of the studied nurses had unsatisfactory knowledge. This study finding was in an agreement with *Salah Eldien et al., (2017)*, who reported that, more than half of the studied nurses had unsatisfactory knowledge regarding nursing management of a child with cardiac disease. This finding might be due lack of opportunity for nurses attending workshops which helpful in refreshing their knowledge, unavailability of suitable booklet & handouts that suit level of nurses' understanding and workload that hindering refreshing of their knowledge.

Concerning the studied nurses total practice regarding the care of pediatric patients with critical cardiac conditions, the current study findings (**Figure 3**), proved that, less than two thirds of the studied nurses had an unsatisfactory level of practice regarding the care of pediatric patients with critical cardiac conditions. These findings were in an agreement with *Abdulrha & Mansour (2019)*, who conduct a study entitled "Effectiveness of an Instructional Program on Nurse's Knowledge and Practice concerning Patients Discharge Planning Post Cardiac Surgery at Cardiac Centers and Hospitals in Baghdad city" and found that, more than half of studied nurses had an unsatisfactory level of practices. This finding might be due to the lack of nurses' knowledge, especially regarding nursing interventions with common complications that occur in pediatric patients with critical cardiac conditions and misunderstanding of their roles because there is no job description or definition of responsibilities in PICU.

On investigating the studied nurses total attitude regarding the care of pediatric patients with critical cardiac conditions, the present study finding (**Figure 4**), revealed that, nearly half of the studied nurses reported indifferent attitude regarding the care of pediatric patients with critical cardiac conditions. This finding was in disagreement with the study of *Abusaad et al., (2019)*, who found that, more than half of the studied nurses had a negative attitude in the care



of children with open heart surgery. From the researcher's point of view, stress of workload, severity of children's conditions, lack of motivation and a deficit of self-confidence was contributing factors which lead to nurses indifferent attitude regarding critical care of pediatric patients.

In assessing the studied nurses total performance regarding the care of pediatric patients with critical cardiac conditions, the findings of the current study (**Figure 4**), represented that, more than half of the study nurses had an adequate performance regarding the care of pediatric patients with critical cardiac conditions. These findings disagrees with the study findings achieved by *Fath-Allah, (2017)*, who mentioned that, more than half of the studied nurses had inadequate performance regarding care of patients undergoing open heart surgery.

Concerning the relation between the studied nurses characteristics and their total performance regarding the care of pediatric patients with critical cardiac conditions, the findings of the present study (**table 17**), clarified that, there were a positive statistically significance difference between the studied nurses total performance and their qualifications. The present study recognized that, the nurses qualification only influenced their performance. Where a higher level of education is associated with adequate nursing performance during providing the care to pediatric patients with critical cardiac conditions. This finding was parallel with the study finding achieved by *Mamdouh et al., (2020)*, about "Assessment of Nurses' Performance Regarding the Implementation of Patient Safety Measures in Intensive Care Units" and mentioned that, there were a positive statistically significant relation between nurses total performance and their qualifications & years of experience. The researcher attributed that, the higher level of education, poses a higher chance for better performance.

Concerning the correlation between total nurses performance & nurses knowledge, practice, attitude regarding care of pediatric patients with critical cardiac conditions, the current study findings (**table 18**), revealed that,

there were positive correlation and highly statistically significance difference between nurses performance and nurses knowledge, practice & attitude. These findings were in an agreement with the study finding done by *Hickey et al., (2012)* about "Pediatric Cardiovascular Critical Care in the United States: Nursing and Organizational Characteristics " and stated that, there were a positive correlation between total nurses performance and nurses knowledge, nurses practice & nurses attitude.

### **Conclusion:**

In light of the current study findings, less than three quarters of the studied nurses had an unsatisfactory level of knowledge, less than two thirds of them had an unsatisfactory level of practice and less than half of them had an indifferent attitude regarding the care of children with critical cardiac conditions. More than half of the studied nurses had an adequate performance regarding the care of the children with critical cardiac conditions.

### **Recommendations:**

**In the light of the current study findings, the following recommendations are suggested:**

- Periodic assessment of knowledge, practice and attitude of all nurses dealing or providing care to children with critical cardiac conditions.
- Only qualified, well trained nurses should be allowed for providing care for children with critical cardiac conditions.
- Periodic assessment and study of the factors affecting nurses' performance positively to improve quality of nursing care provided to children suffering from critical cardiac conditions.
- Needs and problems of pediatric patients with critical cardiac conditions and their caregivers should be assessed regularly.
- Improving nurses' attitude toward nursing care of children suffering from critical cardiac conditions.

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