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Impact of reflective thinking intervention on improving pediatric nursing care

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***Abstract*---**Background: Reflection is a recent trend in medical and nursing education whether in teaching or treating. Reflecting on experiences allowed connections to be made between thoughts, beliefs, and actions. Aim: This study was aimed to evaluate the impact of reflective thinking intervention on improving nursing care given by nurses in pediatric critical care units. Setting: The study was conducted at pediatric critical care units affiliated to Ain shams university hospitals. Subject and methods: The subjects of the study composed of 55 nurses and all available children at the previously mentioned setting. Three types of tools were used to collect data; an interviewing questionnaire sheet, nursing core competencies clinical evaluation tool & nurses' achievements tests. Results: Nearly one quarter of the studied nurses had competent level of nursing core competencies through nurses' reflection pre intervention compared to more than three quarters post intervention. Conclusion: There was a positive impact of reflective thinking intervention on improving pediatric nursing care. Recommendation: Encouraging linkage of nurses' performance appraisal to the extent of their use of reflective thinking in order to increase their core competencies during care of the pediatric patient at critical care unites.

***Keywords*---**reflective, thinking, pediatric, nursing, care.

Introduction

Reflective thinking is a form of mental processing that is applied to gain a better understanding of relatively complicated or unstructured ideas. Reflective thinking also, provides nurses with a useful way to analyze and evaluate their learning processes and helps learners to monitor their development from beginner to experienced (Ghanizadeh 2017). Learning by reflection can be augmented and can be more profound when nurses are encouraged to reflect on the learning event and exercise their judgment about the content and the processes of learning. The benefits of this "consciousness raising" are that nurses learn to chart their development, identify barriers, patterns, and strategies, challenge their own beliefs, and avoid repeating the same mistakes. Reflection in pediatric nursing practice can also lead toward greater confidence and assertiveness or to a change in attitude, perspective, or priorities (Quick, 2016).

Reflection is a critical thought practice, it provides an opportunity to examine nursing practice and identify new knowledge (Chong, 2009). Additionally, it is considered a professional motivator to “move on and do better within practice” with the goal of learning from experiences and examining oneself (Bulman, Lathlean, &Gobbi, 2011). Reflection has the potential to assist learners to enhance their 1 understanding, enrich lifelong learning, reduce clinical errors and develop professional autonomy grounded in expert clinical judgment (Kinsella, 2010, Kolb and Kolb, 2005, Rochmawati and Wiechula, 2010).

In clinical nursing practice; reflection is importance because of three related factors first, nurses need to focus on their knowledge, skill, and behavior, to ensure that they are able to meet the demands of patients and their families. Second, reflective practice is part of the requirement for nurses to constantly update their professional skill. It can help nurses to identify strengths and areas of opportunity for future development. While the third, nurses must be able communicate and interact with other workers outside their discipline. So, they should aim to become self-directed and in touch with other professionals in the health care system. The ability to reflect on practice has become a competency demanded of every healthcare professional in current years. Nursing faculties must encourage student nurses to write reflections and review the content of reflection on clinical practice for developing the skills and knowledge of student nurses (Wain, 2017).

Studies have shown that, nurses who take the time to reflect on their daily experiences provide enhanced nursing care, have a better understanding of their actions, which in return develops their professional skills (Hansebo & Kihlgren, 2001). Reflective thinking is an important component of the nursing curriculum. Research has shown the relationship between student nurses and their mentors is vital. In order for reflection to be effective open mindedness, courage, and a

willingness to accept, and act on, criticism must be present (Bulmam, Lathlean, &Gobbi, 2012).

Models of reflection is helping in understanding the nurses own thinking and learning strategies. In addition, reflective thinking allows them to relate their new knowledge to their previous understanding, consider both abstract and conceptual terms and apply specific strategies to new tasks. A wide variety of models of reflection exist; nurses must decide which framework supports their clinical practice and will best assist their learning experiences. The reflective thinking process involves consciously thinking about and analyzing what is currently being done, what has previously been done, what has been experienced and what has been learned. Models of reflection also guide nurses through this process; each model provides different ways of approaching these considerations (Nicol, &Dosser, 2016)

Significance of study

Reflection in nursing education is considered an effective approach to learning, the current study provides a closer look at a group of nurses' having experiences in caring for critical pediatric patient and then inquired about possible changes in written text once guidance was provided (Hendricks- Ferguson, et al., 2015). Nowadays, with the busy environments, nurses work in often being hectic and demanding it can be difficult for managers to find the time for nursing staff to have reflection time. In the present study we will place a great importance on the concept of reflection and with there being a great deal of evidence showing its benefits should nurses be undertaking more reflection-based activities and sessions to aid and improve the nursing practice (Montgomery, Benzies, & Barnard, 2016).

Aim of the work

This study aimed to evaluate the impact of reflective thinking intervention on improving nursing care given by nurses in pediatric critical care units.

Research hypothesis

The following research hypothesis was developed to conduct this study. Reflective thinking intervention will improve nursing care given by nurses in pediatric critical care units.

Subjects and Methods

Research design

A quasi – experimental design (pre and post-test) used to achieve the aim of the present study.

Study Setting

The study was conducted at Pediatric Critical Care Units namely {Surgical Intensive Care Unit, Neonatal Intensive Care Units and Pediatric Emergency Department} in pediatric hospital affiliated to Ain shams University Hospitals. Pediatric Critical Care Units of the three departments as follows: Surgical Intensive Care Unit (SICU): its' bed capacity are six beds including one bed for isolation and one bed for code blue. Neonatal Intensive Care Units (NICU): its' incubators capacity are fifteen beds including one for resuscitation and one for isolation, while Pediatric Emergency Department (ER): its' bed capacity are twenty beds including one for resuscitation and one for isolation. Each unit has its clean, dirty and storerooms for equipment's, instruments, and waste disposal.

Study subject

A Convenient sample composed of 55 nurses, and all available children in the previously mentioned setting regardless their age, sex, level of education and qualification. They participated as following; Surgical Pediatric Intensive Care Unit (SPICU) by 20 nurses, Neonatal Intensive Care Unit (NICU) by 25 nurses and Pediatric Emergency Department (PED) by 10 nurses.

Tools of data collection

Data was collected by using the following tools: First tool: An interviewing questionnaire (Pre, Post and Follow up): This tool was developed by the researcher and written in simple Arabic language based on a scientific literature review (Aday& Cornelius, 2006). It divided into two major parts:

First Tool
Part I

- Demographic data for nurses such as age, gender, place of work / department, marital Status, occupation, level of education, years of experience & attending training courses).
- Demographic data for children such as (age, gender, diagnosis, health status, length of hospital stay & cause of hospital admission).
- Nursing skills for their settings: including the most skills and competencies practiced in each unit. Nurses' knowledge regarding their role in pediatric critical care units: this part developed by the researcher to assess nurses' knowledge regarding their role in pediatric critical care units included 9 closed ended questions regarding the most important related to critical care nursing skills in surgical pediatric intensive care unit, competencies required in surgical pediatric intensive care unit, most important cases admitted to neonatal intensive care unit and the most important

critical care nursing skills in neonatal intensive care unit, most important cases admitted to pediatric emergency department and the most important critical care nursing skills in pediatric emergency department.

Part II

- Nurses' knowledge regarding the concept of pediatric critical care nursing (Pre, Post and Follow up): this part developed by researcher to assess nurses' knowledge regarding the concept of pediatric critical care nursing included 6 closed ended questions: definition of Pediatric critical care nursing, hospitals' department which provide pediatric critical care nursing, the job description of the pediatric critical care nurse, pediatric critical care must aware of the policies and procedures, competencies needed for pediatric critical nurse, required soft skills for nurses working with pediatric intensive care units.
- Nurses' knowledge regarding the concept of reflective thinking (Pre, Post and Follow up): This part developed by researcher to assess nurses' knowledge regarding the concept of reflective thinking and included 8 closed ended questions: Definition of reflective thinking, methods for applying reflective thinking, importance of using reflective thinking in medical and nursing care, the most reasons for using reflective thinking, factors influencing using reflective thinking, advantages and disadvantages for using reflective thinking. Scoring system: The scoring system for the nurses' knowledge about both concept of pediatric critical care nursing and reflective thinking as giving a score (Zero) for incorrect answer and (one grade) for correct answer.The total level of nurses' knowledge was considered good if the score was (equal or more than 75%), average level if the score was (from 50 % to 75 %) and poor level if the score was (equal or less than50%).

Second tool: Part I

Core Competencies Clinical Evaluation: Nursing core competencies as a clinical evaluation tool (Pre, Post and Follow up): This tool was adopted from (Chisholm et al.2016). It was translated into simple Arabic language to assess nurses' performance regarding reflective thinking through nursing core competencies. It consisted of 10 objectives including 24 core competencies. Scoring system: Scoring of this tool was graded on a "met/needs improvement/unmet" system. The nurse must demonstrate that all the competencies and, in turn, intervention objectives have been met by the end of the intervention. After each week, the nurse completed a self-evaluation utilizing the clinical journal & evaluation tool. The following grading key used to document nurses' performance for each clinical competency (met= 3, needs improvement= 2, unmet = 1). The total level of practice was considered incompetent level if

the score was less than 60 % (14.4 grades) and competent level if the score more than orequal 60 %.

Part II

Nurses' Achievements tests: (Pre, Post and Follow up): This part developed by the researcher to assess nurses' knowledge regarding the critical thinking and reflective thinking and the linking between theory and practice. The questions developed included 3 exams for the three units according to its specialty of the given care (10) questions with a score of 10 grades as the following: for Neonatal Intensive Care Unit (NICU): Most Common Diseases which such as (RDS), for Surgical Intensive Care Unit (SICU): Most Common Diseases which was (Congenital anomalies) Cleft lip & cleft palate, Spina bifida, Hirschsprung's Disease, Intussusceptions, Pyloric stenosis and for Pediatric Emergency Department (PED): Most Common Diseases diseases which was pediatric emergencies trauma and respiratory emergencies. Scoring system: it was related field critical thinking questions were 10 questions developed by the researcher for each department and each question has a score of1 over 10.

Operational Design

The operational design for this study consisted of three phases, namely the preparatory phase, pilot study and fieldwork. Preparatory phase: Review of the current, past local and international related literature and theoretical knowledge of various aspect of the study using books, articles, internet, and magazines. This review helped the researcher to be acquainted with magnitude of the problem and guided the researcher to prepare and design data collection tools.

Content Validity

Validity for tools was ascertained by using two types of validity face and content. A panel of five experts (Jury) from Pediatrics Nursing Department at Faculty of Nursing, Ain shams university (two professors and one assistant professor), from Nursing Administration Department at Faculty of Nursing, Ain shams university (one assistant professor), Psychiatric Mental Health Nursing Department Faculty of Nursing, Ain shams university (one assistant professor). They reviewed the tools for clarity, relevance, comprehensiveness, simplicity, understanding and applicability. More than 95% of the experts have agreed upon the tool. The required corrections and modifications were done in the form of designing and external shape. Reliability: Reliability of tools was assured through measuring the internal consistency by Cronbach's alpha coefficient.

Tool	Items	Reliability		Face validity	Internal consistency
		Reliability Coefficient	Cronbach's Alpha		

1. Nurses' knowledge regarding the concept of pediatric critical care nursing.	6	0.69	0.72	94	Good
2. Nurses' knowledge regarding the concept of Reflective Thinking.	8	0.78	0.84	90	Good
3. Nurses' knowledge regarding NICU.	10	0.70	0.79	89	Good
4. Nurses' knowledge regarding SICU.	10	0.69	0.74	89	Good
5. Nurses' knowledge regarding ED.	10	0.77	0.76	92	Good
6. Reflective Thinking by nurses.	24	0.73	0.74	93	Good

Pilot study

A pilot study was conducted on 10% of the total number of the sample (6 of staff nurses were randomly selected and participated in the pilot study) to examine the sequence of items, feasibility, simplicity, comprehensiveness of the tools, clarity of the language, and for estimating the time needed to fill it out. The nurse interns took 20 to 30 minutes to fill in the three tools. Those participants in the pilot study were included from the main study sample, there were no modifications done in the three tools.

Field of work
Assessment

Data was be collected in the period from 8:00 am to 2pm three days / week by interview and questioner tools. After obtaining approval through an issued letter from the dean of faculty of nursing, Ain Shams University to directors of the previously mentioned setting. The researcher then met the hospital directors and explain the aim of the study and the methods of the data collection to obtain their permission and cooperation for conducting the study. The researcher first met with the nurses, children (and from their records) and their families in pediatric critical care units {surgical intensive care unit, neonatal intensive care units and emergency departments} at pediatric hospital affiliated to Ain shams university hospitals and informed them about the purpose of this study after introducing himself to obtain their acceptance to share in this study. The researcher ensured that, information collected is treated confidentiality and that used only for the purpose of the research. Asked for verbal consent to confirm their acceptance. Each participant

had right to withdrawal from the study at any time and all data that obtained was be considered confidential.

Part I

- Demographic data for nurses (age, gender, place of work / department, marital Status, occupation, level of education, years of experience & attending training courses).
- Demographic data for children (age, gender, diagnosis, health status, length of hospital stay & Cause of hospital admission).
- Nursing Skills for their settings: including the most skills and competencies using in each department. Nurses' knowledge regarding their role in pediatric critical care units: this part developed by the researcher to assess nurses' knowledge regarding their role in pediatric critical care units included 9 closed ended questions regarding the most important related to critical care nursing skills in surgical pediatric intensive care unit, competencies required in surgical pediatric intensive care unit, most important cases admitted to neonatal intensive care unit and the most important critical care nursing skills in neonatal intensive care unit. most important cases admitted to pediatric emergency department and the most important critical care nursing skills in pediatric emergency department.

Implementation
Part II

- Nurses' knowledge regarding the concept of pediatric critical care nursing (Pre, Post and Follow up): this part developed by researcher to assess nurses' knowledge regarding the concept of pediatric critical care nursing included 6 closed ended questions: definition of Pediatric critical care nursing, hospitals' department which provide pediatric critical care nursing, the job description of the pediatric critical care nurse (in each), pediatric critical care must aware of the policies and procedures, competencies needed for pediatric critical nurse, required soft skills for nurses working with pediatric intensive care units.
- Nurses' knowledge regarding the concept of reflective thinking (Pre, Post and Follow up): (Appendix II): this part developed by researcher to assess nurses' knowledge regarding the concept of reflective thinking and included 8 closed ended questions: Definition of reflective thinking, methods for applying reflective thinking, importance of using reflective thinking in medical and nursing care, the most reasons for using reflective thinking, factors influencing using reflective thinking, advantages and disadvantages for using reflective thinking.

Scoring system

The scoring system for the nurses' knowledge about both concept of pediatric critical care nursing and reflective thinking concept and consisted of giving a score of (Zero) for incorrect answer and (one) for correct answer for each closed end question, the scores of questions were summed-up and the total divided by the number of questions giving a mean score, there scores were converted into percent score. The knowledge score was considered good if the score was (equal and more than 75%), average if it was (from 50 % to 75 %) and poor if it was (equal and less than50%).

Each nurse interviewed individually by the researcher to fill the previous mention tools (tool I, tool II, and tool III) (pre- test) during November 2020 to assess nurses' knowledge regarding the concept of pediatric critical care nursing, the concept of reflective thinking, their role in pediatric critical care units and assess nurses' performance regarding reflective thinking through nursing core competencies (pre- test). After that the researcher was started the application of teaching sessions on reflective thinking, 18 hours per week for 4 weeks divided into five sessions each session two hours one hour morning and one hour afternoon for one unit per day / 3days / every week, from 8am–2 pm. The (20) nurse of the SICU was done 10 then 10 followed by the (10) nurses of the PED and finally the (25) nurses of theNICU 10 nurses followed by the 15 nurses.

The researcher' work handbook simple, clear, Arabic language on of reflective thinking with in illustrative and Colorful so the studied nurses can use what they like at any time or any place. This book includes the important elements of which (introduction, definition of pediatric critical care nursing as a concept, concept of reflective thinking, official job description of ministry of health, types of intelligent, importance of emotional intelligent methods of using reflective thinking and nursing core competencies.). The content of the sessions covered many concepts about definition of pediatric critical care nursing, definition of reflective thinking, types of human intelligence, factors affecting on reflective thinking, advantage, and disadvantages of using it. The researcher used different methods of teaching such as lecture, group discussion, teaching material was ed Part

Core Competencies Clinical Evaluation

nursing core competencies as a clinical evaluation tool (Pre, Post and Follow up): This tool was adopted from (Chisholm et al.2016). It was translated into simple Arabic language to assess nurses' performance regarding reflective thinking through nursing core competencies. It consisted of 10 objectives including 24 core competencies. Description of nursing core competencies clinical evaluation tool Objectives: No. (1) Patient-Centered Care: Conduct unit-based Nursing Rounds that offer nurses the opportunity to critically reflect and collaborate with colleagues

in relation to the holistic care they are offering. Objectives: No. (2) Professionalism: Compare professional Code of Ethics documents.

Objectives: No. (3) Leadership: Conduct a leadership self-assessment with associated learning units on leadership basics, emotional intelligence, and leadership approaches. Objectives: No. (4) Systems-Based Practice: Identify system inefficiencies and operational failures that can lead to medication errors. Describe micro/macro level strategies that address. Objectives: No. (5) Informatics and Technology: Searching the internet for information to be used in patient education. Objectives: No. (6) Communication: Utilize unit-based opportunities to reflect, collaborate, and identify areas of communication breakdown and the development of improved strategies to enhance the patient care delivery system with colleagues.

Objectives: No. (7) Teamwork and Collaboration: Conduct unit-based team building activities that include team assessments and team exercises to address the results of the assessment. Objectives: No. (8) Safety : Review specific safety policies / best practices/safety enhancing technologies (i.e.: use of side rails, alarms, client identification, and fall risk data, bar coding, standards of care, client instructions, SBAR). Objectives: No. (9) Quality Improvement: Seek information about quality initiatives in own care settings and organization. Objectives: No. (10) Evidence-Based Practice: Conduct a progressive three-day modular activity forum on evidence-based practice for nurse leaders on a bi- monthly basis to increase expertise and ability to mentor staff within evidence- based process using the articles from the American Journal of Nursing (2010). Evidence Based Practice: Step by Step: 12 Article Series. Lippincott Williams & Wilkins.

Scoring system

Scoring of this tool was graded on a "met/needs improvement/unmet" system. The nurse must demonstrate that all the competencies and, in turn, intervention objectives have been met by the end of the intervention. After each week, the nurse completed a self-evaluation utilizing the clinical journal & evaluation tool. The following grading key used to document nurse performance for each clinical competency (met= 3, needs improvement= 2, unmet = 1). The score of the items were summed-up and the total divided by the number of the items, giving a mean score for part, these scores were converted into percent score. The practice was considered incompetent if the score was less than and equal 60 %(14.4 grades) and competent if the score more than 60 %.

Evaluation

After the implementation of the intervention, the researcher assesses its effect through post-test immediately after the intervention. And three months later, by using the same tools of data collection (tool I, tool II) (post- test) for consecutive three time (1st post- test at April, 2nd post -

test at May and 3rd post- test at June)to evaluate the effect the impact of reflective thinking intervention on improving nursing care given by nurses in pediatric critical care units at pediatric hospital affiliated to Ain shams university hospitals and the test given for each nurse based on his/her unit.

Part IV: Nurses' Achievements tests

(Pre, Post and Follow up): This part developed by researcher to assess nurses' knowledge regarding the critical thinking and reflective thinking and to linking between theory and practice as used before, after and follow up of using an educational supportive material. These mentioned critical thinking questions developed as a 3 exams for each department (10) questions with a score of 10 as following: for Neonatal intensive care unit (NICU): Most Common Diseases which was (RDS), for Surgical Intensive Care Unit (SICU): Most Common Diseases which was (Congenital anomalies) Cleft lip & cleft palate, Spina bifida, Hirschsprung's Disease, Intussusceptions, Pyloric stenosis and for Pediatric Emergency Department (PED): Most Common Diseases which was pediatric emergencies.

Administrative Design

An official approval with written letter clarifying the title, purpose and setting of the study was obtained from dean of faculty of nursing at Ain Shams university to directors of the previously mentioned setting. The researcher then met the hospital. directors and explain the aim of the study and the methods of the data collection to obtain their permission and cooperation for conducting the study.

Ethical consideration

Prior to the study, ethical approval was obtained from the scientific research committee at the Faculty of Nursing, Ain Shams University. Also, official permission was obtained from hospital directors. The aim of this study was explained to all study participates and their verbal informed consent to participate was taken. The studied nurses included in the study were assures about confidentiality of the information gathered and it was used only for the purpose ofthe study and scientific research, and they were informed about their rights to refuse or to withdraw at any time.

Statistical Design

The collected data was coded organized, categorized, and tabulated. Data was analyzed by inferential statistics and used appropriate statistical method as mean, range standard deviation SD, t.test, 2, Pearson correlation co-efficient (r) was used for assessment of the inter relationship among quantitative variables. Statistical significance was

considered at P-value <0.05, highly significant difference obtained at P< 0.001.

Results

Figure (1) Percentage distribution of most important critical care nursing skills at SPICU, NICU and ER

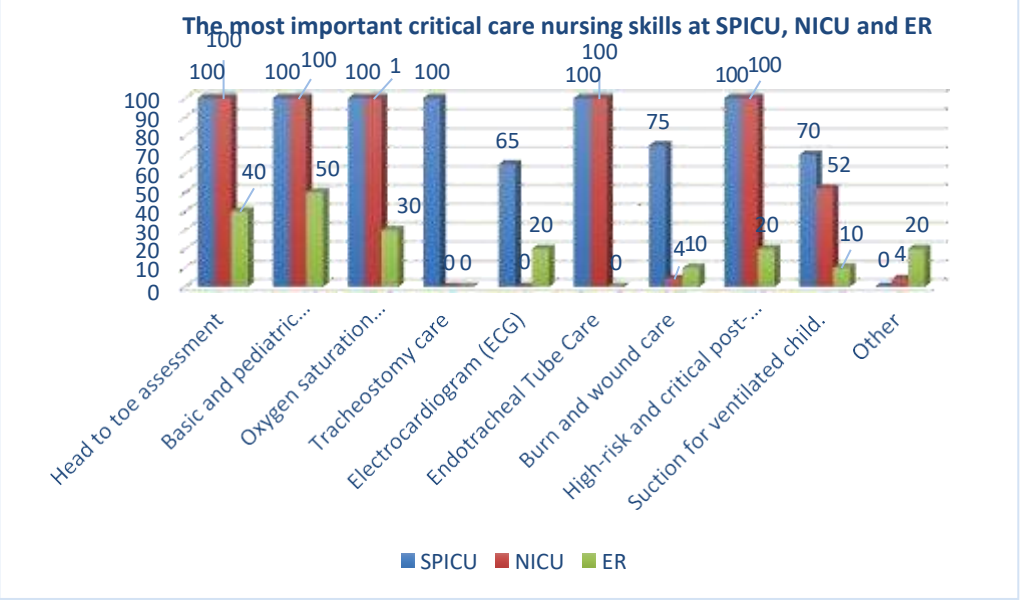

Figure 1. shows the important critical Care nursing skills

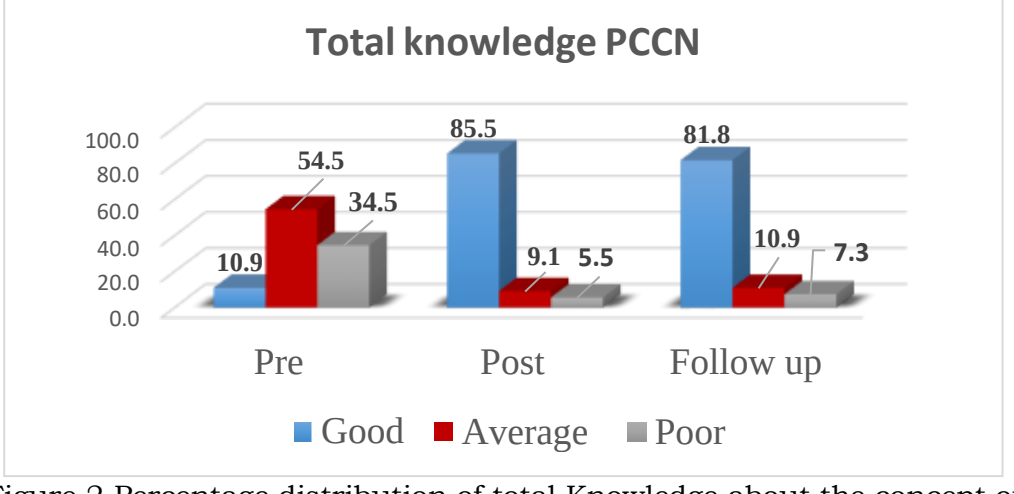

Figure 2.Percentage distribution of total Knowledge about the concept of Pediatric Critical Care Nursing (PCCN) pre, post and follow up intervention. (N=55)

Figure (2) shows that 10.9% of the studied nurses had good level of knowledge regarding the concept of pediatric critical care nursing pre

implementation of the intervention compared to 85.5% post then reduced to 81.8% in follow up phase.

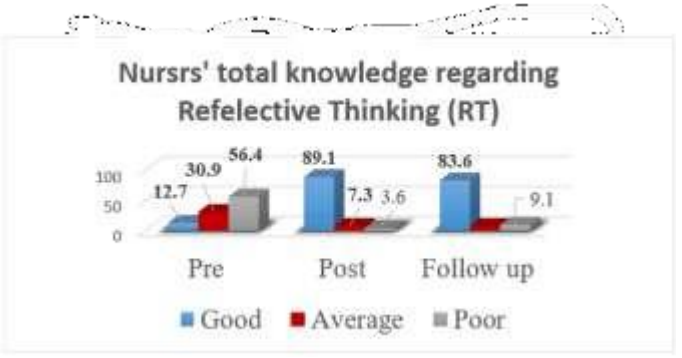

Figure 3. Percentage Distribution of nurses' total knowledge about Reflective Thinking (RT) pre, post and follow up intervention. (N=55)

Figure (3) illustrates that 12.7% of the studied nurses had good level of knowledge about reflective thinking pre implementation of the intervention compared to 89.1% post then reduced to 83.6% in follow up phase.

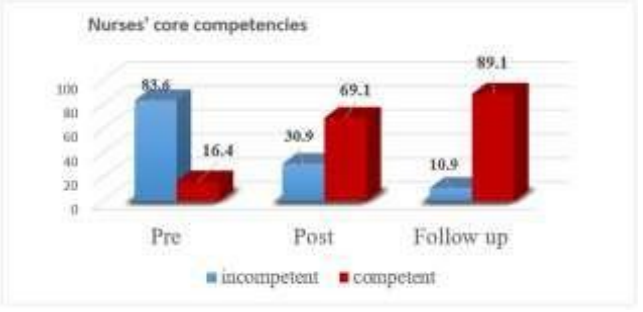

Figure 4. Percentage distribution regarding nursing core competencies through nurses' comments at pre, post and follow up intervention. (N=55)

Figure (4) demonstrates that 16.4% had competent level of nursing core competencies at pre implementation of the intervention to more than two thirds (69.1%) post then compared to 89.1% at follow up phase.

Table 1
Relation between studied nurses' total level of knowledge about the concept of Pediatric Critical Care Nursing (PCCN), reflective thinking, and total level of nursing core competencies pre intervention. (N=55)

Item	Total knowledge about(PCCN) (N=55)						X2	p-value
	Poor N = 19		Average N =30		Good N =6			
	N	%	N	%	N	%		
Total knowledge about Reflective thinking								
Poor	11	57.9%	15	50.0%	5	83.3%		

Average	8	42.1%	9	30.0%	0	0.0%	7.36	0 .11
Good	0	0.0%	6	20.0%	1	16.7%		
Nursing core competencies								
Incompetent	14	73.7%	26	86.7%	6	100.0%	2.75	0.25
Competent	5	26.3%	4	13.3%	0	0.0%		

Table (1) reveals that there was not statistically significant relation between total knowledge, reflective thinking, and nursing core competencies through instructor comments p> 0.05

Table 2
Relation between studied nurses' total level of knowledge about the concept of Pediatric Critical Care Nursing (PCCN), reflective thinking, and totallevel of nursing core post intervention. (N=55)

Item	Total out (PCCN) knowledge ab						X2	p-value
	Poor N = 3		Average N =5		Good N =47			
	No	%	No	%	No	%		
Total knowledge about Reflective thinking								
Poor	3	100.0 %	0	0.0%	28	59.6 %	14.19	0.007
Average	0	0.0%	5	100.0 %	12	25.5 %		
Good	0	0.0%	0	0.0%	7	14.9 %		
Nursing core competencies								
Incompetent	3	100.0 %	5	100.0 %	9	19.1 %	20.92	0.000**
Competent	0	0.0%	0	0.0%	38	80.9 %		

Table (2) demonstrates that there was highly statistically significant relation between total knowledge and nursing core competencies through instructor comments p ≤ 0.001 while, there was statistically significant relation between total knowledge and reflective thinking p ≤0.01

Table 3
Relation between studied nurses' total level of knowledge about the concept of Pediatric Critical Care Nursing (PCCN), reflective thinking, and totallevel of nursing core in follow up intervention. (N=55)

Item	Total knowledge about (PCCN)						X2	p-value
	Poor N =4		Average N =6		Good N =45			
	No	%	No	%	No	%		
Total knowledge about Reflective thinking								

Poor	4	100.0 %	1	16.7%	0	0.0%	81.50	0.000**
Average	0	0.0%	4	66.7%	0	0.0%		
Good	0	0.0%	1	16.7%	45	100.0 %		
Nursing core competencies								
Incompetent	4	100.0 %	0	0.0%	2	4.4%	35.33	0.000**
Competent	0	0.0%	6	100.0 %	43	95.6%		

Table (3) shows demonstrates that there was highly statistically significant relation between total knowledge, reflective thinking, and nursing core competencies through nurses' comments p ≤ 0.001.

Table 4
Relation between total reflective thinking and core competencies through nurses' comments at pre, post and follow up intervention

Item	Reflective thinking						X2	p-value
	Poor		Average		Good			
	N	%	N	%	N	%		
core competencies through nurses' comments (pre)								
Incompetent	22	71.0 %	17	100.0 %	7	100.0 %	8.33	0.016
Competent	9	29.0 %	0	0.0%	0	0.0%		
core competencies through nurses' comments (post)								
Incompetent	17	54.8 %	0	0.0%	0	0.0%	19.049	0.000**
Competent	14	45.2 %	17	100.0 %	7	100.0 %		
core competencies through nurses' comments (follow up)								
Incompetent	4	80.0 %	0	0.0%	2	4.3%	27.08	0.000**
Competent	1	20.0 %	4	100.0 %	44	95.7%		

Table (4) shows that there was highly statistically significant relation between total reflective thinking and core competencies through nurses' comments at post and follow implementation of the program p≥ 0.001.

Table 5
Mean score of nurses' knowledge about PCCN, reflective thinking their intervention on improving pediatric nursing care

Items		Mean ± SD	F test	P value	Sig.
Nurses'	Pre	7.84 ± 1.52			

knowledge regarding the concept of pediatric critical Care Nursing.	Post	10.67 ± 1.33	63.31	0.000**	hs
	Follow up	10.38 ± 1.49			
Nurses' knowledge regarding reflective thinking	Pre	10.07 ± 2.53	76.66	0.000**	hs
	Post	14.53 ±1.5			
	Follow up	14.15 ± 2.11			
Nurses' Achievements tests in NICU	Pre	5.62 ±3.11	46.86	0.000**	hs
	Post	8.87 ± 1.24			
	Follow up	8.87 ±1.09			
Nurses' Achievements tests in SICU	Pre	4.96 ± 2.45	97.17	0.000**	hs
	Post	8.96 ± 0.99			
	Follow up	8.76 ± 1.26			
Nurses' Achievements tests in ED	Pre	4.48 ±3.06	56.71	0.000**	hs
	Post	8.69 ± 1.55			
	Follow up	7.37 ±2.81			

** highly statistically significant

Table (5) demonstrates that there was highly statistically significant difference between pre, post and follow up for implementation of the program concerning nurses' knowledge of the concept of pediatric critical Care Nursing, nurses' knowledge of reflective thinking, nurses' achievements tests related to NICU, SICU and ED respectively.

Table 6
Correlation between reflective thinking and total nurses' knowledge regarding pediatric nursing care (pre)

Items		Nurses' knowledge regarding pediatric	Nurses' knowledge	Nurses' knowledge	Nurses' knowledge	Nurses' knowledge	Nursing core competen
Nurses' knowledge regarding pediatric nursing care	r						
	P value						
Nurses' knowledge	r	0.021					
	P value	0.877					

regarding reflective thinking							
Nurses' knowledge and performance related to NICU	r	0.312*	0.249				
	P value	0.020	0.066				
Nurses' knowledge and performance related to SICU	r	0.144	0.166	0.256			
	P value	0.294	0.227	0.060			
Nurses' knowledge and performance related to ED	r	0.162	0.209	0.434**	0.018		
	P value	0.236	0.125	0.001	0.896		
Nursing core competencies through nurses' comments	r	0.222	0.042	0.021	0.245	0.005	
	P value	0.103	0.762	0.881	0.072	0.969	

Table (6) demonstrates that there was positive correlation between nurses' knowledge regarding pediatric nursing care & nurses' knowledge and performance related to NICU. Furthermore, there was positive correlation between nurses' knowledge and performance related to PED and nurses' knowledge and performance related to NICU at pre intervention.

Table 7
Correlation between reflective thinking and total nurses' knowledge regarding pediatric nursing care (post)

Items		Nurses' knowledge regarding	Nurses' knowledge regarding	Nurses' knowledge	Nurses' knowledge	Nurses' knowledge	Nursing core compe
Nurses' knowledge regarding pediatric nursing care	r						
	P value						

Nurses' knowledge regarding reflective thinking	r	0.649**					
	P value	0.000					
Nurses' knowledge and performance related to NICU	r	0.663**	0.791**				
	P value	0.000	0.000				
Nurses' knowledge and performance related to SICU	r	0.624	0.570	0.744			
	P value	0.000	0.000	0.000			
Nurses' knowledge and performance related to ED	r	0.674	0.814	0.815	0.588		
	P value	0.000	0.000	0.000	0.000		
Nursing core competencies through nurses' comments	r	0.073	0.099	0.187	0.092	0.234	
	P value	0.597	0.474	0.171	0.503	0.086	

Table (7) shows that there was positive correlation between nurses' knowledge regarding pediatric nursing care & nurses' knowledge and performance related to NICU, nurses' knowledge and performance related to PSICU, nurses' knowledge and performance related to PED. Adding to that there was positive correlation between nursing core competencies through nurses' reflection at post intervention.

Table 8
Correlation between reflective thinking and total nurses' knowledge regarding pediatric nursing care (follow up)

Items		Nurses' knowledge regarding pediatric	Nurses' knowledge regarding	Nurses' Knowledge and performance	Nurses' knowledge related to NICU	Nurses' knowledge and	Nursing competencies cor
Nurses' knowledge	r						

regarding pediatric nursing care	P value						
Nurses' knowledge regarding reflective thinking	r	0.100					
	P value	0.467					
Nurses' knowledge and performance related to NICU	r	0.513**	0.060				
	P value	0.000	0.663				
Nurses' knowledge and performance related to SICU	r	0.504**	0.227	0.475**			
	P value	0.000	.096	0.000			
Nurses' knowledge and performance related to ED	r	0.642**	0.219	0.504**	0.595**		
	P value	0.000	0.108	0.000	0.000		
Nursing core competencies through nurses' comments	r	0.003	0.014	0.198	0.148	0.040	
	P value	0.984	0.918	0.147	0.281	0.774	

Table (8) describes that there was positive correlation between nurses' knowledge regarding pediatric nursing care & nurses' knowledge and performance related to NICU, nurses' knowledge and performance related to PSICU, nurses' knowledge and performance related to PED at follow up intervention Using action research, nursing were examined by providing R.A.V.E. (Reflective Thinking Allows Variety for Excellence) reviews to see how they used their past experiences and their knowledge and beliefs to arrive at the appropriate answers and real life situations. It proposes that a reflective thinking intervention plays an important factor in the learning process, emotional intelligence, and professional development of pediatric nursing care *(sangkhamkul et al., 2020).* Therefore this study aimed to evaluate the impact of reflective thinking intervention on improving nursing care given by nurses in pediatric critical care units.

As regards to the studied nurses' sociodemographic characteristics the study results showed that, more than three quarters of the studied nurses were females and more than half of them, their age ranged between 20 to less than 30 years. This result was in disagree with *Tutticci, (2017)* who carried out a study entitled "Measuring Reflective Thinking and Self-efficacy After High Fidelity Simulation to Optimize the Reflective Capacity of Final Year Nursing Students in Australia" and mentioned that more than three quarters of the studied nursing students were females and about half of them, their age ranged between 20 to less than 30 years. From the researcher point of view this result might be due to the study of nursing for male hasn't been made available until recently so the most of the studied nurses were female and their age ranged between 20 to less than 30 years.

The results of present study illustrated that, about two thirds of the studied nurses were married . Also, it revealed than more than one third of them had bachelor degree and were staff nurses. This result was in disagree with that of *Panghet al.,(2019)* who carried out a study entitled "The effect of reflection on nurse-patient communication skills in emergency medical centers in Iran" and reported that, more than one third of the studied nurses were married and more than half of them had bachelor degree and were staff nurses. From the researcher point of view this result might be due to studying nursing in faculty of nursing more recently than technical Institute. Regarding thestudied nurses' years of experience in each unit, the results of the present study illustrated that, more than half of the studied nurses had 5 years to

less than 10 years of experience at neonatal intensive care unit (NICU). This results was disagree with *Khalil et al., (2019)* who studied "of Educational Program on Pediatric Nurses' Practice Regarding Non-Pharmacological Pain Management in Neonatal Intensive Care Unit in Egypt" and found that less than two third of the studied nurses had 1to less than 3 years of experience at NICU. Also, the study results showed that less than three quarters of them had less than 5 years at pediatric emergency department (PED). This result was disagree with results of *Keykha et al., (2016)* who studied "Clinical competency and its related factors in nurses in Iran" and found that less than half of the studied nurses had less than 10 years of experience at PED. From the researcher point of view, this result might be due to increase burnout of nurses at neonatal intensive care unit which lead to most of the studied nurses were new graduated.

Concerning attending training courses, the study results showed more than one third of the studied nurses attended training course for surgical pediatric intensive care unit (SPICU) while less than one quarter of them attended training course for NICU. This result was agreed with *Coats et al., (2018)* who studied "Nurses' Reflections on Benefits and Challenges of Implementing Family-Centered Care in Pediatric Intensive Care Units in America" and mentioned that, slightly more than one third of the studied nurses attended training course for SPICU unit while less than one quarter of them attended training course for NICU. From the researcher point of view, this result might be due to increase workload in these clinical areas which effect on the studied nurses' attendance training course. The results of present study revealed that, all studied nurses who attended training courses had benefits from these courses. This result was incongruent with *EL- Shafey et al., (2019)* who carried out a study entitled "Effect of an Educational Training Program for Nurses about Infection Control Precautions in Their Practice in the Pediatric Critical Care in Egypt" and found that less than half of the studied nurses working in pediatric critical care had benefits from training course. From the researcher point of view, this result might be due to re-demonstration to the studied nurses.

Also, the study results illustrated that less than one quarter of the studied nurses attended reflective thinking courses while, all the nurses who attended courses regarding reflective thinking had benefits of practical work and knowledge acquiring. This result was in similarity with *Welp et al., (2018)* who carried out a study entitled "The importance of reflecting on practice: How personal professional development activities affect perceived teamwork and performance in Australia" and found that about one quarter of the studied nurses attended reflective thinking courses and all of them had benefits of practical work and knowledge acquiring. From the researcher point of view, this result might be due to the studied nurses' desire to improve their knowledge & practice and enhance pediatric nursing care. The current study results showed that less than half of the studied children were less than one month and had respiratory system diseases while, about two thirds of them stayed less than one week at the hospital and about half of them main causes for admission because of acute respiratory symptoms. This result was in dissimilar with a study done by *Hickey et al., (2016)* entitled "Critical Care Nursing's Impact on Pediatric Patient Outcomes in Massachusetts at United state" and mentioned that less than half of studied children were less than one year and had trauma while more than two thirds of them stayed more than one month at the hospital and main causes for admission because of trauma. From the researcher point of view, this result might be due to low immunity of the studied children.

The current study results revealed that all the studied nurses selected head to toe assessment, basic & pediatric advanced cardiovascular life support, oxygen saturation measurement, high-risk and critical post-operative care as the most important critical care nursing skills at NICU & SPICU. This result was supported by *Silva et al., (2020)* who carried out a study entitled "Practices of Nurses for the Care of Premature in Neonatal Intensive Care Unit in Brazil" and mentioned that majority of the studied nurses selected head to toe assessment, basic& pediatric advanced cardiovascular life support, oxygen saturation measurement as the most important critical care nursing skills at NICU&SPICU. Also, this result was in agreement with *Pour&Kaber, (2017)* who studied "Learning and quality improvement : nursing in the pediatric intensive care unit in British Columbia" and mentioned that, the majority of the studied nurses selected trauma as most cases admitted to pediatric intensive and all of them selected head to toe assessment, basic & pediatric advanced cardiovascular life support, oxygen saturation measurement, tracheostomy care, high-risk and critical post-operative care a PICU. From the researcher point of view this results might be due to recurrence of these procedures inside these critical areas.

The present study results demonstrates that half of the studied nurses selected basic and pediatric advanced cardiovascular life support as the most important critical care nursing skills at ER department. This result was congruent with *Enyumaet al., (2020)* who carried out a study

entitled “Paediatric Emergency Department preparedness in Nigeria” and showed that more than half of the studied nurses selected basic and pediatric advanced cardiovascular life support as the most important critical care nursing skills in ER department. From the researcher point of view this results might be due to the importance and criticality of these procedures in nursing care provided to pediatrics patients at ER departments. Also, the results demonstrated that four fifth of the studied nurses selected patient- centered care and safety as the competencies needed at SPICU. This result was similar to *Coats et al., (2018)* who studied “Nurses' Reflections on Benefits and Challenges of Implementing Family-Centered Care in Pediatric Intensive Care Units in Washington ” and reported that most of the studied nurses selected patient- centered care and safety as the competencies needed at SPICU. From the researcher point of view, this result might be due recurrent nursing pitfills related to patient safety in SPICU.

The study results showed that slightly less than two thirds of the studied nurses selected leadership as the competencies needed at NICU. This results was in disagree with *Macho, (2018)* who carried out a study entitled “Nurses' Knowledge, Attitudes, and Perceived Self-competency Regarding Individualized Developmental in the Neonatal Intensive Care Unit in New York” and reported that more than two third of studied nurses selected note signs of distress before, during, and after a feeding as the competencies needed at NICU. From the researcher point of view, this result might be due complexity of care in this clinical area which need to competent leaders. The current study results showed that all studied nurses selected teamwork & Collaboration and evidence-based practice as the competencies needed at ER. This result was opposite to *Manoharan et al., (2018)* who carried out a study entitled “Knowledge on Triaging among Pediatric Nurses in Pediatric Emergency Services (PES) in Vellore, India” and showed that majority of the studied nurses selected triage training as the most important critical care nursing skills in PES. From the researcher point of view, this result might be due nature of this clinical area and complexity of care which need evidenced based practice.

The study results illustrated that most of the studied nurses had correct answer regarding definition and policies of pediatric critical care nursing at post program implementation compared to most of them at pre program implementation then reduced to more than two third at follow up. This result was in agreement with *Pour & Kaber, (2017)* who reported that, most of the studied nurses had correct answer regarding definition and policies of pediatric critical care nursing at post program implementation compared to most of them at pre program implementation then reduced to more than two third at follow up. From the researcher point of view, this result might be due to lack of good monitoring and follow up from administrative position of nursing. In relation to studied nurses’ total knowledge regarding the concept of pediatric critical care nursing, the study finding showed that, few number of the studied nurses had good knowledge regarding the concept of pediatric critical care nursing at

preprogram implementation compared to most of them at post program implementation then reduced to more than three quarter at follow up. This result was in agreement with Bayoumi& *Mahmoud, (2017*) who conducted a study entitled 'Effect of education program on nurses' knowledge and practice regarding care of central venous line in pediatric hemodialysis in Egypt" and reported that, there was improvement in total level of nurses' knowledge, when comparing with before and immediately after implementation, as well as before and after 6 months of implementation of teaching guidelines. From the researcher point of view, this result might be due to work overload which in turn affect nurses' knowledge.

The results of present study demonstrated that, less than one quarter of the studied nurses had correct answer regarding the way or method for applying reflective thinking, the importance of using reflective thinking in medical and nursing care in general, advantages of using reflexive thinking at pre program implementation compared to most of them at post program implementation while decrease to three quarter at follow up. It also showed highly statistically significant association between pre and post program implementation. This result was in agreement with that of *Kim et al.(2018)* who carried out a study entitled" Effects of a work-based critical reflection program for novice nurses in Korea " and mentioned that, improved the studied nurses' knowledge regarding the way or method for applying reflective thinking, the importance of using reflective thinking in medical and nursing care in general, advantages of using reflexive thinking at post program implementation and follow up compared to pre program implementation. Also, mentioned that highly statistically significant association between pre and post program implementation. From the researcher point of view, this result might be due to the effectiveness of hands-on training through such preceptorship.

According to the studied nurses' total knowledge regarding reflective thinking, the results illustrated that, less than one quarter of the studied nurses had good knowledge of reflective thinking at pre program implementation compared to most of them at post then reduced to more than three quarter at follow up. This result was agreed with *Kim et al., (2018)* who mentioned that, improving the studied nurses' total knowledge regarding critical reflective at post and follow up program implementation compared to pre program implementation . From the researcher point of view, this result might be due to lack of training courses related to reflective thinking before program implementation. As regard the studied nurses' core competencies at pre, post and follow up implementation of the program, the present study stated that less than one quarter of the studied nurses had competent level of nursing core competencies through nurses' reflection at pre program implementation compared to more than two third of them at post while elevated to most of them at follow up implementation of the program. This result was in the same line with *Zhang et al., (2017)* who carry out a study entitled "The Effects of Reflective Training on the Disposition of

Critical Thinking for Nursing Students in China" who reported that the studied nursing student had competent level of nursing core competencies through reflective training at post and follow up program implementation compared to pre program implementation. From the researcher point of view, this result before program due to lack of on job training .

Regarding studied nursing core competencies through nurses reflection at pre, post and follow up implementation of the program, the study results illustrated that a few number of the studied nurses met the skills regarding quality improvement and evidence-based practice at pre program implementation compared to less than half of them post program implementation then elevated to most of them at followup. This result was in agreement with *Kim et al., (2018)* who carried out a study entitled "Effects of a work-based critical reflection program for novice nurses in Korea" and illustrated that a few number of the studied nurses met the skills regarding quality improvement and evidence-based practice at pre program implementation compared to less than half of them post program implementation then elevated to most of them at follow up. From the researcher point of view, this result might be due to effectiveness of program implemented on the staff.

According to the studied nurses' core competencies through instructor comments at pre, post and follow up implementation of the program, the current study results clarified that less than quarter of the studied nurses had competent level of nursing core competencies through instructor comments at pre program implementation compared to more than two thirds of them at post program implementation then elevated to most at follow up implementation of the program. This result in similarity with *Zhang et al., (2017)* who illustrated that improved the studied' nurses core competencies through instructor comments at post and follow up program implementation compared to pre program implementation. From the researcher point of view, this result before program due to lack of continuous education.

The results indicated that there was not statistically significant relation between total knowledge, reflective thinking and nursing core competencies pre program implementation. This result was in disagreement with *Wanda et al., (2016)* who conducted the study entitled "Using flash cards to engage Indonesian nursing students in reflection on their practice in Indonesia" and found that there was highly statistically significant difference between the studied nurses' total knowledge, reflective thinking and nursing core competencies. From the researcher of view this results might be attributed to lack of application of reflective thinking between staff nurses in study setting. The study findings demonstrates that there was highly statistically significant relation between total knowledge reflective thinking and nursing core competencies post program implementation while there was statistically significant relation between total knowledge and reflective thinking post program implementation. This result was in

agreement with *Kim et al.(2018)* who said that there was highly statistically significant relation between total knowledge and nursing core competencies post program implementation and also, said that there was statistically significant relation between total knowledge and reflective thinking. From the researcher of view this results might be attributed to correction of false information post program implementation which lead to enhance reflective thinking and core competencies.

The study findings demonstrates that there was highly statistically significant relation between total knowledge, reflective thinking and nursing core competencies at follow up implementation of the program. This result was in agreement with *Wanda et al., (2016)* who conducted the study entitled "Using flash cards to engage Indonesian nursing students in reflection on their practice in Indonesia" and mentioned that The study findings demonstrates that there was highly statistically significant relation between total knowledge, reflective thinking and nursing core competencies at follow up implementation of the program. From the researcher of view this results might be due to follow up after implementation of program enhance information and reflective thinking.

The study findings revealed that there was highly statistically significant difference between total reflective thinking and nursing core competencies through staff nurses at post and follow up implementation of the program. This result was supported by *Scheel et al., (2017)* who conducted the study entitled "Reflection in the training of nurses in clinical practice settings in Denmark" who mentioned that there was highly statistically significant difference between reflective thinking and nursing core competencies through staff nurses at post and follow implementation of the program. From the researcher of view this results might be attributed to the importance of reflective thinking application in healthcare settings. The present study findings showed that there was highly statistically significant difference between pre and post implementation of the program regarding nurses' knowledge and performance related to NICU, SICU and ED at pre implementation of the program. While there was not statistically significant difference between post and follow up implementation of the program regarding Nurses' Knowledge and performance related to NICU, SICU and ED.

This result was supported by *Ahmed et al., (2020)* who carried out a study entitled "Impact of an Educational Program on Improving Nurses Knowledge and Practice Concerning Caring for Neonates with Respiratory Distress Syndrome in Egypt" and mentioned that there was highly statistically significant difference between pre and post implementation of the program regarding nurses' knowledge and performance related to NICU, SICU and ED at pre implementation of the program and there was not statistically significant difference between post and follow up implementation of the program regarding Nurses' Knowledge and performance related to NICU . From the researcher point of view, this result might be due to lack of knowledge related to pediatric nursing care lead to wrong waywhen nurses performing procedures

Concerning nurses' knowledge and performance related to NICU, the results of the present study illustrated that, few number of the studied nurses had good knowledge and performance related to NICU at pre program implementation compared to majority of them at post program implementation but, minimized to most of them at follow up implementation of the program.This result was in the same line with that of *Abou Zed & Mohammed, (2019)* who studied "Impact of nursing guidelines on nurses' knowledge and performance regarding to prevention of ventilator associated pneumonia in neonates in Egypt" and reported that, few of the studied nurses had satisfied level of knowledge and performance regarding to prevention of ventilator associated pneumonia in neonates at pre program implementation compared to majority of them at post and follow up implementation of the program.

From the researcher point of view, this result might be due to the nurses' diploma and institutes the largest part of employed personnel at hospitals; therefore any role defect will declines the quality of nursing care given to neonates' infants. Consequently, they need continuous training programs and follow up care delivered to neonates. Also, the results clarified that few number of the studied nurses had good knowledge and performance related to SICU at pre program implementation compared to most of them at post after that declined to more than three quarter at follow up implementation of the program. This result was in the same line with *Hussein & Rada, (2016)* who carried out a study entitled "Effectiveness of an Educational Program on Nurses' Knowledge Concerning Preoperative Care of Children Undergoing Intestinal Obstruction Surgery at Pediatric Teaching Hospitals in Baghdad City"and mentioned that there was improve in the studied nurses' knowledge and performance related to preoperative care of children undergoing intestinal obstruction surgery at post and follow up program implementation compared to pre implementation of the program. From the researcher's point of view, this result might be due to unavailability of staff evaluation tool and lack of monitoring.

In the light of the study findings revealed that few number of the studied nurses had good knowledge and performance related to ED at pre program implementation compared to most of them at post then decreased to more than three quarter at follow up implementation of the program. This result was supported by *Faheimet al., (2019)* who carried out a study entitled "Effect of Triage Education on Nurses' Performance in Diverse Emergency Departments in Egypt " and stated that the stability of knowledge and performance improvement with a slight decrease when comparing the post and follow up evaluation of the studied nurses. From the researcher's point of view, this result might be due to absence of orientation for newly graduated and newly recruited nurses. The current study results demonstrates that there was highly statistically significant difference between pre, post and follow up for implementation of the program concerning nurses' knowledge of the concept of pediatric critical care nursing and nurses' knowledge of

reflective thinking and nurses' knowledge and performance related to NICU, SICU and ED. This result was supported by *Wanda et al., (2016)* who conducted the study entitled "Using flash cards to engage Indonesian nursing students in reflection on their practice in Indonesia" and found that there was highly statistically significant difference between pre, post and follow up for implementation of the program concerning studied nurses' knowledge regarding clinical practice and nurses' knowledge of reflective thinking. From the researcher point of view, this result might be due to the effectiveness of program implementation.

The study results illustrated that there was highly statistically significant difference between pre, post and follow up for implementation of the program regarding nursing core competencies through nurses' reflection and nursing core competencies through instructor comments. This result was in disagreement with *Saunders et al.,(2018)* who carried out a study entitled "Graduate registered nurses' reflections on implementing safety and quality improvement projects in Australia" and mentioned that there wasn't statistical significant difference between nursing core competencies through nurses' reflection and nursing core competencies through instructor comments. From the researcher point of view, this result might be due to core competencies through instructor comments affect on knowledge and performance of studied nurses and therefore affect on nursing core competencies through reflection.

In the light of the study findings, the results indicated that there was highly statistically significant difference between pre & post and pre & follow up regarding nurses' knowledge regarding pediatric nursing care, nurses' knowledge and performance related to NICU,SICU and ED . This results was in agreement with *El- Ziady Ahmed et al., (2017)* who conducted study entitled "Effect of Implementing an Educational Program about Family Centered Developmental Care on Neonatal Nurses' Knowledge and Practices at Neonatal Intensive Care" and illustrated that there was highly statistically significant difference between pre & post and pre & follow up regarding nurses' knowledge regarding pediatric nursing care, nurses' knowledge and performance related to NICU. From the researcher point of view, this result might be due to follow up after implementation the program help in highlighting on weak point in studied nurses' knowledge and practice to improve it.

The current study results illustrated that that there was highly statistically significant difference between pre & post and pre & follow up regarding nurses' knowledge regarding reflective thinking. Also, it showed there was highly statistically significant difference between pre & post, pre & follow up and post & follow up for nursing core competencies through nurses' reflection. This result was in agreement with *Saunders et al.,(2018)* who mentioned that there was highly statistically significant difference between pre & post and pre & follow up regarding nurses' knowledge regarding reflective thinking. Also, mentioned there was highly statistically significant difference between

pre & post, pre & follow up and post & follow up for nursing core competencies through nurses' reflection. From the researcher point of view, this result might be due to close monitoring post program implementation.

The study results demonstrated that there was positive correlation between nurses' knowledge regarding pediatric nursing care & nurses' knowledge and performance related to NICU. It also, showed that there was positive correlation between nurses' knowledge and performance related to ED and nurses' knowledge and performance related to NICU at pre implementation of the program. This result was in the same line with that of *Abou Zed & Mohammed, (2019)* who mentioned that there was positive correlation between nurses' knowledge regarding pediatric nursing care & nurses' knowledge and performance related to NICU. It also, showed that there was positive correlation between nurses' knowledge and performance related to ED and nurses' knowledge and performance related to NICU at pre implementation . From the researcher point of view, this result might be due to lack of the studied nurses' information regarding pediatric nursing care pre program implementation lead to incompetent performance during implemented any procedure related to pediatric nursing care.

The present results showed that there was positive correlation between nurses' knowledge regarding pediatric nursing care & nurses' knowledge and performance related to NICU, SICU & ED. Also, showed that there was positive correlation between nursing core competencies through nurses' reflection and nursing core competencies through instructor comments at post implementation of the program. This result was in the same line with *Coats et al., (2018)* who mentioned that there was positive correlation between nurses' knowledge regarding pediatric nursing care & nurses' knowledge and performance related to NICU, SICU. Also, showed that there was positive correlation between nursing core competencies through nurses' reflection and nursing core competencies through instructor comments at post implementation of the program.

From the researcher point of view, this result might be attributed to the studied nurses acquired accurate information and knowledge regarding pediatric nursing care post program implantation which enhance their performance and core competencies regarding pediatric nursing care. The current results showed that there was positive correlation between nurses' knowledge regarding pediatric nursing care & nurses' knowledge and performance related to NICU, SICU & ED at follow up implementation of the program. This result was in agreement with *EL-Shafey, El-Dakhakhny & Mohammed, (2019)* who mentioned that there was positive correlation between nurses' knowledge regarding infection control precautions in pediatric critical care & nurses' knowledge and performance related to NICU, SICU & ED at follow up implementation of the program. From the researcher point of view, this result might be attributed to close monitoring at follow up implementation of the program enhance nurses

knowledge and performance related to pediatric nursing care at NICU, SICU & ED.

Reflection is a very useful professional and personal development tool that yields positive pediatric nursing care and learning outcomes when effectively practiced. Hospitals and educational institutions should develop processes and practices that make reflective thinking an early and routine part of an everyday classroom and clinical practice. Nursing is a career that entails delivering patient care and necessitates a continuous reflection on the actions taken when providing that care to ensure that pediatric patients and their families receive quality care *(Anderson, 2019).* Nurses need to reflect on actual experiences to deal with current clinical challenges. Reflection is an active process in which nurses identify the situation, recognize their emotional response, examine their thoughts and feelings internally, evaluate their actions and the situation, and prepare a new action as a result of the theory-practice gap identified. Pediatric nursing are responsible for caring for not just children, but also the children's families as well. When working with these vulnerable groups of people, safety is paramount. Through reflection, students can observe and focus on the experience frame of their lives to resolve contradictions in practice *(Nukpezah et al., 2021).*

Conclusion

In the light of the study findings, it was conclude that, few number of the studied nurses had good total knowledge regarding the concept of pediatric critical care nursing and reflective thinking at preprogram implementation compared to most of them at post program implementation and but, minimized to majority of them at follow up implementation of the program. Also, few number of the studied nurses had good total knowledge and performance related to NICU, SICU, ED at preprogram implementation compared to most of them at post program implementation but, minimized to majority of them at follow up implementation of the program. Less than one quarter had competent level of nursing core competencies through nurses' reflection at preprogram implementation compared to more than three quarters of them at post program implementation while elevated to most of them at follow up implementation of the program. There was highly statistically significant difference between pre, post and follow up for program implementation concerning nurses' knowledge of the concept of pediatric critical Care Nursing, nurses' knowledge of reflective thinking, nurses' knowledge and performance related to NICU, SICU and ED respectively. Also, there was highly statistically significant difference between pre & post and pre & follow up regarding nurses' knowledge regarding reflective thinking

Recommendation

Based upon the results of the current study the following recommendations suggested:

- Encouraging linkage of nurses' performance appraisal to the extent of their use of reflective thinking.
- It is necessary to train reflective thinking in schools and nurseries in order to be educated from an early age because it is an important issue to enhance self- awareness and emotional intelligence.
- Recommended with structured reflection and facilitated group reflective dialogues which offer nurses the opportunity to reach a deeper level of exploration and arrive at a higher level of thinking.
- Facilitated reflective learning groups which increase nurses' confidence in their roles; improved morale, motivation; and change in awareness regarding value of knowing residents, importance of listening, value of building relationships with families and importance of patient-centered approach.
- There is a need for rigorous, well-designed empirical studies exploring the impact of reflective thinking on organizational change.
- There is a need for well-designed empirical studies exploring the impact of reflective thinking on patient outcomes.

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