

Effect of Peers' Application of Modified Peyton's Four –Step Approach Versus Traditional Learning on Pediatric Nursing Students' Performance

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Abstract

Background: Effective learner-centric innovative learning strategies are now being utilized to encourage active student participation, creative thinking and improve the problem-solving abilities of them. One of these strategies is modified Peyton's four-step approach, in which students, learn from their peers through repeated observations of the procedure. It involves active student participation, where the student takes responsibility for their peers learning. It helps students mastering the academic skills, encourages more positive attitudes toward learning, gains a deeper understanding of the subject area, develops a more positive self-image, and improves their attitudes toward faculty and teachers. **Aim:** The aim of this study was to determine the effect of peers' application of modified Peyton's four-step approach versus traditional learning on pediatric nursing students' performance. **Setting:** The study was carried out in pediatric nursing laboratories at the Faculty of Nursing, Alexandria University. **Subjects:** The subjects of present study comprised of "78" students divided randomly into "study and control" groups 36 students in each, in addition to 6 students who act as tutors and teach their peers. **Tools:** Three tools were used, namely, Neonatal Cardiopulmonary Resuscitation (CPR) Performance Observational Checklist, Modified Peyton's Four-Step Approach Tutors' Satisfaction Assessment Scale and Modified Peyton's Four-Step Approach Tutees' Satisfaction Assessment Scale. **Results:** The study revealed a statistical significant difference between the study and control groups in relation to performing neonatal CPR procedure immediately after applying modified Peyton's four-step approach by peers ($P= 0.000^*$). **Conclusion:** It can be concluded that applying modified Peyton's four-step approach by peers as a method of teaching has a positive effect on the clinical performance of pediatric nursing students. **Recommendation:** The main recommendation of current study was to apply modified Peyton's four-step approach by peers as an innovative method of teaching in all academic nursing departments at the Faculty of Nursing, Alexandria University and Damanhour University.

Keywords: Modified Peyton's four-step approach, Tutees, Tutors, Peer Learning, Pediatric Nursing, Students' Performance, Neonatal Cardio-Pulmonary Resuscitation.

DOI: 10.7176/JHMN/69-09

Publication date: December 31st 2019

1. Introduction

Nursing is a practice-based discipline in which clinical teaching plays an extremely essential role in preparing nursing students to be able to know and do the clinical principles in practice. Additionally, it is important to recognize that what the student does is more crucial in determining what is learned than what the teacher does^[1]. Clinical setting either in open community like community health settings or hospitals as pediatric hospitals is a place in which nursing students practice their technical skills with a real patients or clients in which the students have a chance for applying theories into practice^[2]. In that frame, **Abdallah et. al (2014)** emphasized that clinical skills acquisition and learning through dealing with real patients can be very stressful for nursing students because they know that making mistakes can harm patients. That's why the development of skill laboratories is mandatory in which students can practice clinical skills in a safe environment^[3]. Nowadays, skills-lab as a methodological teaching is a part of the training of almost all medical or nursing faculties^[4].

Skills-lab offers a protected "mistake forgiving" training environment that allows students to practice procedures skills on models or with each other prior to performing them on real patients. It lessens the students' anxiety they experienced when meet patients for the first time in clinical setting particularly in special areas as Neonatal Intensive Care Units (NICUs) as well as if they deal with a live saving situation in public^[5].

Particular ingredients have been contributed to a successful learning experience in skills-lab as pre-defined learning goals, sustained practice and feedback and the instructional approach as well^[6]. A variety of instructional approaches was used in the skills-lab to convey technical skills to students^[7]. The "see one, do one" method is the most predominant used one in which the skill is first demonstrated and elaborated by the teacher. Then, the students

re-demonstrate the skill themselves under the supervision of teacher^[8]. However, **Rodney Peyton (1998)** has suggested another method^[9]. This instructional approach that becomes increasingly prevalent in education is known as “Peyton’s Four-Step Approach”. It has been represented as the standard instructional approach within training courses of the European Society of Cardiology since 2000. It comprises of four well defined instructional steps and is referred to as the “Peyton’s Four-Step Approach” accordingly^[10,11]. These steps are; Step 1: Demonstration: The teacher performs the skill at the usual pace and with no extra comments. Step 2: Deconstruction: The teacher repeats the skill, describing all sub-steps of the procedure in details. Step 3: Comprehension. The teacher performs the skill for third time, follows the student’s instructions and explanation of the procedural sub-steps. And step 4: Performance. The student performs the skill while explaining each sub-step on his own without help from the teacher^[10,11].

The Peyton's four- step approach has numerous advantages as it incorporate several learning theories particularly step three (comprehension) that helps students mastering the procedure skills which denotes mental representation of, but not actual, body movement. Before this step, the students should properly think during steps one and two before instructing the teacher that helps students to consolidate their ideas before expressing them with subsequent incorporation of innovative knowledge into existing knowledge^[12].

In this context, **Münster et.al (2016)** emphasized that, when students instruct their teacher, that amalgamates “learning-by-teaching” approach which proposes that learning skills are reserved to a higher degree when they are being taught to another individual^[10]. Fortunately, the fourth step (performance) involves an independent performance of the procedural skills. Hence, with frequent practice, students will be highly confident about their skills and will able to perform satisfactorily in different situations as well. However, Peyton’s four-step approach was intended for teaching in a teacher-student ratio of 1:1 that does not reflect prevalent skills-laboratory training environment and cannot be used for small group teaching^[13].

Nursing education today's facing many challenges; one of these is the massive increase in the number of students to the number of educators which imperatively leads to loss of students’ skill acquisition^[14]. This statement emphasized that students in higher education must participate in and take some responsibility for their learning which requires space for thinking or reflecting besides, interaction with others, and learning from and with peers and experts. Within this context, Peer Learning (PL) is uniquely placed to contribute to meet this requirement^[15]. Moreover, **Walker and Peyton (1998)** as an expert group developed modified Peyton’s four-step approach for small group teaching that incorporate PL with Peyton’s four-step approach. The modified Peyton’s approach consists of the following sequential parts: **A**– Demonstration and Deconstruction, **B**– Comprehension, Tutor’s Performance and Observation, **C**– Comprehension, Tutee’s Performance and Observation, **D** –Tutor and Peer Feedback, **E** – Circulation and **F** – Completion and Conclusion^[9].

In this respect, **Nikendei et.al (2014)** conducted a study on modified Peyton’s four-step approach for small group teaching and found that this approach revealed to be practicable, easy for Tutors to realize, and well accepted by trainees^[12]. Beside the advantages of Peyton’s four-step approach, PL allows clinical teaching to move from a teacher-centered approach - which is considered a traditional and passive strategy to a student-centered approach, in which students become active participate in their learning^[16].

Peer learning is not a new concept, it has been present in the nursing literature since the 1970s, but unluckily, evidence indicates that, less attention has been given to PL over recent years in nursing education^[17]. It is based on Bandura’s social learning theory, which postulates that students learn substantially from observing the behavior of others. This increases trainees’ satisfaction through more active participation in learning and lower their anxiety. At the same time, it improves tutors’ behaviors and competence through the development of their teaching skills^[18].

Despite the great role that modified Peyton’s four step approach plays in overcoming the shortages in the faculty staff, and enhancing students' performance, no study was conducted till the time of the study at the Faculty of Nursing, Alexandria University or Damanhour University to investigate the effect of peers’ application of modified Peyton’s four step approach on nursing students’ performance. In addition, recently, many nursing departments as pediatric nursing department are facing many challenges such as the increase in the number of students and the decrease in the number of educators due to many reasons such as sick leaves and child rearing vacations. Moreover, due to the application of the infection control system at all hospitals, the NICUs were not allowed to all students to take their experience. These units allow the training of only few students to maintain its infection control. So, for achieving their objectives, the faculty staff depends mainly on the faculty skills-labs for teaching the clinical procedures which also need staff members for effective small group teaching. Moreover, nursing students must be competent to tackle real clinical situations efficiently and apply the training in real situations. Hence, it is imperative for the students to receive training in a safe place as skills lab before performing skills on real neonates. One of the most fundamental clinical skills is neonatal cardiopulmonary resuscitation (CPR) procedure which is the most crucial one as a lifesaving and the most anxiety provoking for students owing to its difficulty. Additionally, the pediatric nursing students thought that, training on neonatal CPR using traditional methods was not sufficient for them to be confident and competent in performing it^[19]. This necessitates the

introduction of an innovative clinical training approach such as modified Peyton's four-step approach for students to improve their performance in skills lab which in turn, could efficiently affect their performance in the different clinical settings either inside the hospitals as NICUs or in the broader community settings.

AIM OF THE STUDY

The aim of this study was to:

Determine the effect of peers' application of modified Peyton's four-step approach versus traditional learning on pediatric nursing students' performance.

RESEARCH HYPOTHESIS

Students who learn through their peers using modified Peyton's four-step approach exhibit higher competency in performing neonatal CPR procedure than those who learn through traditional method.

OPERATIONAL DEFINITION

Modified Peyton's four-step approach

It refers to that randomly selected students (Tutors) were trained to teach their peers (Tutees) from the same semester how to perform neonatal CPR procedure on a manikin/model in the pediatric nursing labs. Also, they were trained on applying modified Peyton's four-step approach by their peers for small group teaching using the following sequential steps: **A**–Demonstration and Deconstruction, **B**–Comprehension, Tutor's Performance and Observation, **C**–Comprehension, Tutee's Performance and Observation, **D**–Tutor and Peer Feedback, **E**–Circulation and **F**–Completion and Conclusion.

2. Materials and Method

2.1 Materials

2.1.1 Study design:

A quasi-experimental research design was used to conduct this study.

2.1.2 Study setting

The study was conducted at Pediatric Nursing laboratories (lab A and lab B) at the Faculty of Nursing, Alexandria University.

2.1.3 Study subjects

G* Power Program (Version 3.1.9.4) was used to estimate the effect size of the sample in experimental research design using the following parameters; Effect size d (0.80), α error probability/significance level (0.05), $1-\beta$ error probability /power (0.95) and the allocation ratio N_2/N_1 (1). The total sample size was 70 students, divided into two groups 35 students per group with a ratio 1:1.

A convenient sample of 78 participants nursing students enrolled in the Pediatric Nursing Department, Faculty of Nursing, Alexandria University, during the second semester of the academic year 2018-2019 were included in the present study. This sample was allocated randomly into two equal groups "study and control" 36 students for each in addition to 6 students who act as a tutor among the study group.

2.1.4 Study Tools

Three tools were used to collect necessary data:

Tool 1 : Neonatal Cardiopulmonary Resuscitation Performance Observational Checklist:

It was developed by the Pediatric Nursing Staff of the Faculty of Nursing, Alexandria University (2018) [20] and adopted by the researchers from Pediatric Nursing Procedures book to assess the pediatric nursing students' skills in performing neonatal CPR procedure using modified Peyton's four-step approach by peers. It includes 25 items; each item is graded as follows: two points for correct complete action, one point for correct incomplete action and zero point for not done or incorrect action. The total scores of neonatal CPR performance ranged from (0-50 point). The total score represented as follows; poor performance (< 30 point), fair performance (30-< 37.5 point), and good performance (37.5-50 point). These scores were converted into percentages and it was categorized as follows: Good ($\geq 75\%$), Fair (60- <75 %), and Poor (<60%).

Tool 2: Modified Peyton's Four-Step Approach Tutors' Satisfaction Assessment Scale:

This scale was developed by the researchers after thorough review of related literature [11,12,15] to assess the tutors' satisfaction regarding the modified Peyton's four-step approach after acting as teacher (Tutor) and teach neonatal CPR procedure to their peers. It consisted of 12 statements with a five-point Likert scale ranged from strongly disagree (1) to strongly agree (5). The higher the score, the higher the satisfaction level. The total score ranged from "12-60". The cut off point for "High satisfaction" is $\geq 75\%$ of the total score; "moderate satisfaction" is between 50% to less than 75% of the total score, while "low satisfaction" less than 50% of the total score. It represented as follows; low satisfaction (12-29), moderate satisfaction (30-44), and high satisfaction (45-60).

Tool 3: Modified Peyton's Four-Step Approach Tutees' Satisfaction Assessment Scale:

This scale was developed by the researchers after thorough review of related literature [11,12,15] to assess the tutees'

satisfaction regarding modified Peyton's four-step approach after the neonatal CPR procedure had been taught to them by their peers (tutors). It consisted of 16 statements with a five-point Likert scale ranged from strongly disagree (1) to strongly agree (5). The higher the score, the higher the satisfaction level. The total score ranged from "16-80". The cut off point for "High satisfaction" is $\geq 75\%$ of the total score; "moderate satisfaction" is between 50% to less than 75% of the total score, while "low satisfaction" less than 50% of the total score. It represented as follows; low satisfaction (16-39), moderate satisfaction (40-59), and high satisfaction (60-80).

Additionally, the sheet containing pediatric nursing students' personal and academic characteristics as age, sex, residence, last certificate and GPA was attached to these tools.

2.2 Methods

2.2.1 Administrative process

- An official permission to conduct the study was obtained from the responsible authority of the Faculty of Nursing, Alexandria University after explaining the aim of the study.

2.2.2 Development of study tools

- Tool two and tool three were developed by the researchers after a thorough review of the relevant literature^[11,12,15].
- Tools were tested for their content validity by five experts in pediatric nursing, community nursing and nursing education field.
- Reliability of the three tools was asserted using Cronbah's Alpha coefficient test. The coefficient values were ($r = 0.75$ for Tool one and 0.80 for Tool two and Tool three) which are acceptable.

2.2.3 Pilot study

- A pilot study was conducted on 9 pediatric nursing students who were selected randomly from the same setting to evaluate the clarity and applicability of the research tools. Accordingly, the necessary modifications were done. These students were excluded from the study subjects.

2.2.4 Data collection

- Students volunteers were recruited by means of advertisements among pediatric nursing students.
- The total sample size (78 students) was divided randomly into two equal groups "study and control" 36 students for each in addition to 6 students who were selected randomly to act as tutors.
- Both the study and control groups were assigned randomly to Pediatric Nursing lab A & lab B, one of them was for the application of modified Peyton's four-step approach by peers (study group) and the other one was for traditional learning (control group).
- The pediatric nursing students' personal and academic characteristics were taken and recorded by the researchers for both groups.
- The students in the study group were divided randomly into 6 subgroups, 7 students in each (small group size).
- One student in each study subgroup was selected randomly to act as a tutor and 6 students were the tutees.
- The six tutor students were trained by the researchers on performing the neonatal CPR procedure, the researchers demonstrated the procedure in front of them firstly. Then, the tutors have re-demonstrated the procedure more than one time until reaching competency level in performing it as they were evaluated by the researchers using neonatal CPR performance observational checklist (Tool 1)
- After that, the six tutor students were trained by the researchers to explain and perform the neonatal CPR procedure for their peers using the modified Peyton's four-step approach.
- Each tutor student acted as a teacher for his/her peers by performing the procedure in front of them using modified Peyton's four-step approach.
- Each subgroup in the study group was trained to perform neonatal CPR procedure on a manikin in using modified Peyton's four-step approach by their peers using the following sequential steps:
 - A. Demonstration and Deconstruction:** The Tutor demonstrated the neonatal CPR procedure silently "at normal speed without commentary" (**Demonstration**). Then, the Tutor demonstrated the procedure while describing each step in-details to the Tutees (**Deconstruction**). So, the Tutor performs Steps 1 and 2 of Peyton's four-step approach to **all Tutees**.
 - B. Comprehension, Tutor's Performance and Observation:** The **Tutor** performs Step 3 (demonstrate the procedure following the **instructions of Tutee 1** for each step), while **all other Tutees are observing**.
 - C. Comprehension, Tutee's Performance and Observation:** **Tutee 1** performs Step 3 following instructions of **Tutee 2**, while the **other Tutees are observing**.
 - D. Tutor and Peer Feedback:** **Tutee 1** receives feedback by peer **Tutees**, followed by **Tutor** feedback.
 - E. Circulation:** Parts C and D are repeated in turn until the last **Tutee** has performed **Step 3** following the instructions of a **Tutee**. This part includes a combination of both (**Steps 3 and Step 4**), meaning that all of the Tutees perform neonatal CPR procedure under verbal instructions of a peer Tutee (**Step 3:**

Comprehension). Followed by **(Step 4: Performance)** in which students simultaneously demonstrated and described the procedure step by step.

F. Completion and Conclusion: Finally, the modified Peyton's four-step approach session terminated when the **last Tutee** performs **Step 3 and Step 4:** followed by **Peer** and **Tutor** feedback.

- Each tutor asked to evaluate his/her peers during **step 4** (re-demonstration) using the neonatal CPR performance observational checklist (Tool 1) immediately after performing the procedure and two weeks later (during the rotation evaluation).
- The researchers assessed tutors' satisfaction regarding modified Peyton's four-step approach after demonstrating the procedure in front of their peers using (Tool 2).
- The researchers assessed tutees' satisfaction regarding modified Peyton's four-step approach after their demonstration of the procedure in front of their peers using (Tool 3).
- The students in the control group were divided randomly into 6 subgroups, 6 students in each.
- The neonatal CPR procedure was taught to the students in the control group by traditional method using two-step approach "see one and do one" in which the clinical instructor performed the neonatal CPR procedure only one time (demonstration). Then, the students could perform it independently for one time (re-demonstration) under the clinical instructor's supervision.
- Each student in the control group was evaluated by the clinical instructor using neonatal CPR performance observational checklist (Tool 1) immediately after performing the procedure and two weeks later (during the rotation evaluation).
- Data was collected during three months from the beginning of February till the end of April 2019.

2.2.5 Statistical analysis:

Data collected was coded and transferred into specially designed formats to be suitable for computer feeding. International Business Machine - Statistical Package for Social Sciences (IBM-SPSS version 25) was utilized for both data presentation and statistical analysis of the results. Categorical data were expressed in the form of frequencies and percentages. Numeric data were expressed in the form of mean and standard deviation (SD). Chi-square test and Fisher's Exact test were used to test the significance of results of qualitative variables. The level of significance selected for this study was P value equal to or less than 0.05.

2.2.6 Ethical considerations:

- Written informed consent was obtained from all students after providing an appropriate explanation about the aim of the study.
- Students have the right to withdraw at any time.
- Confidentiality, anonymity and privacy were assured.
- Refusal to participate or withdrawal had no impact on the subsequent evaluations or other assessments in the curriculum of the students.

3. Results

Table 1: reveals the distribution of pediatric nursing students in the study and control groups and the Tutor students according to their personal and academic characteristics. It was noticed that there was an equal distribution of the students in both the study and control groups concerning their age. The majority of the students (88.9 %) in both groups were more than 20 years old, while two thirds of the tutor students aged 20 years or less and similar percentage of them were females (66.7 %). Whereas, sex distribution among study and control groups revealed that there was an equal distribution of the students in the study group in relation to their sex (50%). On the other hand, 58.3% of the students in the control group were females. Additionally, all the tutor pediatric students were from rural areas, graduated from general secondary school, and had GPA ranged from B- to B+ as well.

In relation to the residency, it was found that more than half of the students in the study group (55.6%) were from rural areas, while almost two thirds of those in the control group (63.8%) were from urban areas. Concerning the students' last certificates; it was noted that the majority of students in the study and the control groups were graduated from general secondary school (80.6 % and 83.3 % respectively). In relation to the students' last GPA it was noticed that around two thirds of students in the study and control groups had GPA ranged from B- to B+ (63.8 % and 61.1 % respectively). No statistical significant differences were detected between the study and control groups in relation to all personal and academic characteristics. This means that both groups are matched.

Table 1: Distribution of Pediatric Nursing Students in the Study and Control Groups and the Tutors According to their Personal and Academic Characteristics

Personal and Academic Characteristics	Study (Tutees) Group n. (36)		Control (Traditional) Group n. (36)		Test of significance FET P value	Tutors n. (6)	
	No.	%	No.	%		No.	%
Age (years)							
≤ 20	4	11.1	4	11.1	—	4	66.7
> 20	32	88.9	32	88.9		2	33.3
$\bar{X} \pm SD$	21.2 ± 2.1 years		21.3 ± 0.8 years			20.0 ± 0.894 years	
Sex							
Male	18	50.0	15	41.7	FET:0.604	2	33.3
Female	18	50.0	21	58.3	P: 0.302	4	66.7
Residence							
Urban	16	44.4	23	63.8	FET:0.195	0	0.0
Rural	20	55.6	13	36.1	P:0.098	6	100.0
Last certificate							
General Secondary School	29	80.6	30	83.3	FET:1.000	6	100.0
Associate degree of Nursing	7	19.4	6	16.7	P:0.500	0	0.0
GPA							
B+&B &B-	23	63.8	22	61.1	FET:0.120	6	100.0
C+&C&C-	13	36.1	14	38.9	P:0.060	0	0.0

FET: Fisher's Exact Test P: P value of Fisher's Exact Test * Significant at $P \leq 0.05$

Tutors: students who act as teachers and teach their peers **Tutees:** students who receive teaching from their peers

The distribution of pediatric nursing students in the study and control groups according to their level of performance of neonatal CPR procedure immediately and two weeks after the conduction of teaching using modified Peyton's four step approach is illustrated in Table 2. Regarding to level of performance immediately after the conduction of teaching, it can be seen from the table that none of the students in the study group (0.0%) compared to approximately half (47.2%) of those in the control group had poor performance level. Moreover, about one fifth of them in both groups had fair performance level (19.4% for each). Meanwhile, the majority of students in the study group (80.6%) compared to 33.4% of those in the control group had good performance level. There was a statistical significant difference between the study and control groups concerning their performance level immediately after the conduction of teaching using modified Peyton's four step approach ($P= 0.000^*$).

The table also clarified the distribution of pediatric nursing students in the study and control groups according to their level of performance of cardio-pulmonary resuscitation procedure two weeks after the conduction of teaching using modified Peyton's four step approach. It was found that the highest percentage of the students in the study group (94.4%) and 80.6% of those in the control group had good performance level. Also, the minority of them in the study and control groups had fair performance level (5.6% and 19.4% respectively). Meanwhile, none of the students either in the study or control group (0.0%) had poor performance level. However, the difference was not statistically significant where $P = 0.127$.

Table 2: Distribution of Pediatric Nursing Students in the Study and Control Groups According to their Level of Performance of Neonatal Cardio-pulmonary Resuscitation Procedure Immediately and Two Weeks after the Conduction of Teaching Using Modified Peyton's Four Step Approach

Levels of Performance	Immediately after the conduction of teaching using modified Peyton's four step approach						Two weeks after the conduction of teaching using modified Peyton's four step approach						Test of Significance
	Study group n. (36)		Control group n. (36)		Total		Study group n.(36)		Control group n. (36)		Total		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Poor	0	0.0	17	47.2	17	23.6	0	0.0	0	0.0	0.0	0.0	X ² :78.102 P: <0.001* FET : 0.254 P: 0.127
Fair	7	19.4	7	19.4	14	19.5	2	5.6	7	19.4	9	12.5	
Good	29	80.6	12	33.4	41	56.9	34	94.4	29	80.6	63	87.5	

X²: Chi Square test

FET: Fisher's Exact Test

P: P value of Chi Square/ Fisher's Exact test

* Significant at P ≤ 0.05

Table 3: highlights the distribution of Tutor pediatric nursing students in the study group according to their satisfaction levels immediately after the conduction of teaching using modified Peyton's four step approach. It is clear from the table that all Tutor students were strongly agree in that acting as an instructor made them feel proud because of helping their friends, decrease their anxiety from learning the procedure for the first time, and made them realize the importance of being qualified in teaching and practice as well. Additionally, it increased their self- confidence, sense of seriousness in explaining and demonstrating the procedure, students' interaction between each other, motivated them to learn more experiences, created conducive environment for learning, and decreased students' anxiety during performing the procedure. Furthermore, 66.7% of the students were strongly agree in that acting as an instructor, increased their confidence in their ability to teach other students and made them realize the importance of being efficient in work. Whereas, 50% of them were strongly agree in that acting as an instructor made them realize their intellectual and professional development.

Table 3: Distribution of Tutor Pediatric Nursing Students in the Study Group According to their Satisfaction Levels Immediately after the Conduction of Teaching Using Modified Peyton's Four Step Approach

Items of Satisfaction	Levels of Satisfaction n. (6)			
	Strongly Agree		Agree to Some extent	
	NO.	%	NO.	%
Acting as an instructor made me/ leads to:-				
1- Feel proud because of helping my friends.	6	100.0	0	0.0
2- Increase my self- confidence.	6	100.0	0	0.0
3- Decrease students' anxiety during performing the procedure.	6	100.0	0	0.0
4- Increase my confidence in my ability to teach other students.	4	66.7	2	33.3
5- Decrease my anxiety from learning the procedure for the first time	6	100.0	0	0.0
6- Realize my intellectual and professional development.	3	50.0	3	50.0
7- Increase my sense of seriousness in explaining and demonstrating the procedure.	6	100.0	0	0.0
8- Realize the importance of being efficient in work.	4	66.7	2	33.3
9- Realize the importance of being qualified in teaching and practice.	6	100.0	0	0.0
10- Motivate me to learn more experiences.	6	100.0	0	0.0
11- Create conducive environment for learning.	6	100.0	0	0.0
12- Increase the students' interaction between each other.	6	100.0	0	0.0

The distribution of Tutor pediatric nursing students in the study group according to their satisfaction levels immediately after the conduction of teaching using modified Peyton's four step approach is revealed in **Table 4**. In relation to methodological approach, it was found that all Tutor students were strongly agree in that being taught using modified Peyton's four step approach encouraged them to learn from each other and that the overall steps of the procedure were helpful in the delivery of information faster (100.0% for each). In addition, the vast majority of them (94.4%) were strongly agree in that the current method of teaching provides them an opportunity to learn through involvement. Slightly more than two thirds of those Tutees (66.7%) were strongly agree in that this approach provided them an opportunity for learning through repetition and that the repeated observations of the procedure facilitated the remembering of procedural steps.

Regarding to the flow of the training, all Tutee students were disagree to some extent that there were few repeated observations of the procedure and few independent performances as well. Meanwhile, almost half of them (47.2%) were strongly agree that the sequence of training was good. Concerning the Tutees focus of attention, there were strongly agreements between the highest percentages of them (72.2%, 55.5% and 66.7% respectively) that Tutors' instructions on the procedure were helpful, Tutees' commenting on the procedure was helpful, and that the current method grasping the students' attention. As regards the Tutees comprehension of the didactic approach, it was obvious that 94.4% of the Tutee students were strongly agree in that the present approach made them feel confident in performing the procedure independently and created conducive environment for learning. Moreover, 66.7% of them were also strongly agree that modified Peyton's four step approach decreased students' anxiety during the procedure and increased their ability to comprehend the procedure better. On the other hand, 75.0% of them were disagree to some extent that the time expenditure was suitable.

Table 4: Distribution of Tutee Pediatric Nursing Students in the Study Group According to their Satisfaction Levels Immediately after the Conduction of Teaching Using Modified Peyton's Four Step Approach

Items of Satisfaction	Levels of Satisfaction n.= (36)							
	Strongly agree		Agree to some extent		Neutral		Disagree to some extent	
	No	%	No	%	No	%	No	%
Methodological approach								
- Encourage students to learn from each other.	36	100.0	0	0.0	0	0.0	0	0.0
- Provides an opportunity for learning through repetition.	24	66.7	7	19.4	5	13.9	0	0.0
- Provides an opportunity for learning through involvement.	34	94.4	2	5.6	0	0.0	0	0.0
- The repeated observations of the procedure facilitates the remembering of procedural steps.	24	66.7	7	19.4	5	13.9	0	0.0
- The overall steps were helpful in delivery of information faster.	36	100.0	0	0.0	0	0.0	0	0.0
Flow of the training								
- There were few repeated observations of the procedure.	0	0.0	0	0.0	0	0.0	36	100.0
- There were few independent performances.	0	0.0	0	0.0	0	0.0	36	100.0
- Sequence of training was good.	17	47.2	10	27.8	5	13.9	4	11.1
Tutees focus of attention								
- Tutors' instructions on the procedure were helpful.	26	72.2	5	13.9	5	13.9	0	0.0
- Tutees' commenting on the procedure was helpful.	20	55.5	5	13.9	2	5.6	9	25.0
- This method grasping the students' attention.	24	66.7	5	13.9	7	19.4	0	0.0
Tutees comprehension of the didactic approach								
- Decrease students' anxiety during the procedure.	24	66.7	5	13.9	7	19.4	0	0.0
- Feel confident in performing the procedure independently.	34	94.4	2	5.6	0	0.0	0	0.0
- Increase my ability to comprehend procedure better.	24	66.7	7	19.4	5	13.9	0	0.0
- Create conducive environment for learning.	34	94.4	2	5.6	0	0.0	0	0.0
- Time expenditure was suitable.	5	13.8	2	5.6	2	5.6	27	75.0

Table 5: portrays the distribution of Tutors and Tutees pediatric nursing students in the study group according to their total percent scores of satisfaction levels immediately after the conduction of teaching using modified Peyton's four step approach. It was apparent from the table that the majority of Tutor students had high levels of satisfaction (83.3%). While, the minority of them had moderate levels of satisfaction (16.7%). Furthermore, it was revealed from the table that almost three quarters of Tutee students had high levels of satisfaction (72.2%). Meanwhile, nearly one third of them had moderate levels of satisfaction (27.8%).

Table 5: Distribution of Tutors and Tutees Pediatric Nursing Students in the Study Group According to their Total Percent Scores of Satisfaction Levels Immediately after the Conduction of Teaching Using Modified Peyton’s Four Step Approach

Levels of Satisfaction	Tutors		Tutees	
	No. (6)	%	No. (36)	%
Low	0	0.0	0	0.0
Moderate	1	16.7	10	27.8
High	5	83.3	26	72.2

4. Discussion

Skill lab acquisition, skill retention and skill competency are important in nursing education either in pediatric nursing or community health nursing as well as all fields of nursing education. Currently, increasing students to teacher ratio, limited resources and unpredictable learning environment makes teaching process so difficult. Although the students are playing a pivotal role in life saving procedures such as neonatal CPR and it is ought to be performed properly and skillfully. They might be unable to perform such procedure competently in lab before practicing it in a real situation due to its difficulty and inadequate training in skills-lab. So, the current study aimed to determine the effect of peers’ application of modified Peyton’s four step approach versus traditional learning on pediatric nursing students' performance.

Modified Peyton’s four step approach provide a good chance for enhancing memorization of the neonatal CPR procedure as one of the important and difficult learning procedures. Additionally, incorporating PL in the application of modified Peyton’s four-step approach as one of the innovative teaching strategies can upgrade the students' learning in the clinical settings and enhance their clinical competencies. Also, PL is acceptable by nursing students and might help in dealing with shortage of staff as well as overcoming the obstacles come due to limited resources [21].

The findings of the current study revealed that the majority of students in the study group compared to around one third of those in the control group had good performance level of neonatal CPR procedure immediately after the conduction of teaching using modified Peyton’s four step approach with statistical significant difference between them. These findings could be due to the effect of PL when combined with the Modified Peyton’s four step approach which intensifies the benefit from these two innovative approaches in addition to the modeling effect which comes from observing the tutor who has the same age, experience, and the same level of anxiety from the same procedure and at the same academic semester performing the procedure properly. Once students found their peers able to perform that procedure effectively and properly, that encouraged and motivated them to do so. Finally, in the comprehension step, each tutee could learn through instruct other Tutee.

This finding comes in line with a study conducted at the Faculty of Nursing, Mansoura University (2019) entitled “Effectiveness of Peyton’s four-step approach on nursing students’ performance in skill-lab training” which documented that there is a significant improvement in the level of performance after implementing Peyton’s four-step approach [22]. Additionally, **Krautter et al (2015)** assumed that Peyton’s Step 3 (Comprehension) represents the crucial instructional substep in Peyton’s four-step approach and therefore leads to a superior performance of clinical skills as compared to standard instruction [23]. On the contrary, **Jenko et al (2012)** declared that the 4-stage teaching technique does not significantly improve the quality of the chest compressions and they added that changes in neonatal CPR courses are needed in order to improve chest-compression quality, and to provide tutees with more accurate feedback [24]. In this respect, **McKenna and French (2011)**, found that tutees students learned procedures more broadly from their colleagues (tutors) than from their teachers [25].

Two weeks after the performance of the procedure using modified Peyton’s four step approach by peers, it was found that the students' performance improved in the highest percentage of the students in the study group and to the majority of them in the control group with no statistical significant difference between them. This improvement may be due to the time factor which means the time of measuring the retention test was the time of the students' clinical evaluation of the rotation. Moreover, students in both groups were allowed to re-demonstrate many procedures before their evaluation including neonatal CPR procedure in open Lab. Similar findings were reported by **Münster et al (2016) and Schroëder et al (2017)** [10,26]. Despite the improvement in the performance of both groups, the study group performance was higher than the control group. This could be due to retaining the information learned by their peers. This finding goes in congruence with the finding of **Mikami et. al (2011)**, who found an improvement in the students' performance and retention of that performance after the application of PL strategy [27]. In contrast, **Bloomfield et. Al (2010)**, showed a decrease in nursing students' skills performance after two weeks of the application of PL strategy [28].

The success of innovative teaching strategies is reflected on so many domains, one of the important domains of evaluation for the success of the method is students’ satisfaction level either as Tutors or Tutees [29]. The result of the current study reflected that the majority of tutor students had a high satisfaction level immediately after the conduction of teaching using modified Peyton’s four step approach. As all tutor students were strongly agree in

that acting as instructors made them feel proud for the following reasons: helping their friends, decreasing their anxiety from learning the procedure for the first time, making them realize the value of being qualified in teaching and practicing, increasing their self-confidence, their sense of seriousness in explaining and demonstrating the procedure, their interaction between each other, motivated them to learn more experiences, creating conducive environment for learning, and decreasing students' anxiety during performing the procedure.

Additionally, around two thirds of the Tutor students were strongly agree in that playing the role of instructors increased their confidence in their ability to teach other students and made them realize the importance of being efficient in work. Whereas, half of them were strongly agree in that acting as an instructor made them realize their intellectual and professional development. These findings may be attributed to taking the responsibilities of the teacher and changing their role from a receiver of information to a sender of it. Moreover, preparing them to act as instructors and to be competent in performing the procedure by the researchers increased their self-confidence, their self-esteem and decreased their anxieties from making mistakes in front of their peers.

Furthermore, acting as instructors made the tutor realize the tutees' needs as students, and be aware of the most appropriate way of delivering the information and aware of the more suitable way of practicing the procedure. Also, the tutors' high satisfaction level was due to their success in transferring the clinical and theoretical parts of the neonatal CPR procedure to their peers which was made evident by high tutees' achievement of the procedure immediately after the conduction of teaching using modified Peyton's four step approach. In addition to step 3 (comprehension) with repeated feedback which are crucial component for acquisition and retention of skills. These findings come in congruent with the findings of **Dehghani et al (2014)** who stated that peer tutoring methods not only produce better academic achievement than do traditional methods of instruction but also improve students' self-esteem and satisfaction, promote positive attitudes about school, encourage interaction between students of different types, and promote information retention through students' achievement^[30]. These findings verified by **Krautter et al (2011)**^[8] who stated that Peyton's Four-Step Approach is superior to standard instruction with respect to professionalism and leads to faster performance when tutees perform the learned skill for the first time. Also, these findings were confirmed by **Archer et al (2015)**, who declared that demonstration when combined with feedback are crucial component for acquisition and retention of skills^[31]. Additionally, these results were documented in further researches done by **Mills et al, 2014, and Krautter et al, 2015** so the researchers noted that combining PL with modified Peyton's four-step approach add value for the research^[23,29].

Peer learning is a potentially powerful way of sharing knowledge and experience with each other it is an effective motivational tool for nursing students to increase learner's self-efficacy and enhance their psychomotor skills^[18]. The current study shed the light on that almost three quarters of Tutee students had high levels of satisfaction. This finding support **Awad and Mohamed (2019)** findings as they reported that the studied students accepted the Peyton's four step approach^[22].

In relation to methodological approach, the satisfaction of the Tutee students was obvious in that all of them were strongly agree in that being taught using modified Peyton's four step approach encouraged them to learn from each other and that the overall steps of the procedure were helpful in the delivery of information faster. In addition, the vast majority of them were strongly agreed that the current method of teaching provides them an opportunity to learn through involvement. Slightly more than two thirds of those Tutees were strongly agreed that this approach provided them an opportunity for learning through repetition and that the repeated observations of the procedure facilitated the remembering of procedural steps.

These findings may be due to numerous possible explanations; it may be due to the relaxed atmosphere provided during the procedure, assuring them that all their mistakes are acceptable and respectable and immediate correction will be made by the researchers. In addition to being taught by one of them (tutor), who has the same needs and characteristics, motivate them to learn, made the procedure easier which, in turn made them more interactive and involved with the procedure.

These findings were support **Nikendei et al (2014)** as they found that skills-lab training using Peyton's four step approach as a methodological teaching approach contributes to a successful learning experience in introduce novel clinical technical skills especially among small groups^[12]. Also, **Sabaq et al (2016)** indicated that the performance score of the nursing students who learned by PL, was significantly better than those trained by assistant teaching staff in traditional clinical sessions^[18].

The present study findings support the findings of a study conducted by **Ahmad and Mohamed (2018)** on 'The Effect of Peer Learning vs. Traditional Learning on Knowledge and Clinical Performance of Critical Care Nursing Students' which reflected that there is a significantly better performance scores among PL group, and the majority of the study group students were positively satisfied as regarding PL. Moreover, they added that the majority of the students in peer group stated that being taught by their peer increases interaction and collaboration with other students; they can communicate more freely with their peer than with their clinical instructor, they don't feel freer to approach the instructor for help than their peers. Moreover, they agreed that the feedback they received from their peers is more helpful and they learn more from their peers than from their clinical instructor. Furthermore, they expressed their belief that PL experience was worth the time spent and students felt more

comfortable when the performance is being assessed by their peers [32].

Certainly, incorporating PL through modified Peyton's four step approach bridge the gap between students and instructors results in smooth flow of learning process that also enhanced by constructive feedback [18]. Regarding to the flow of the training in the current study, although all Tutee students were disagree to some extent that there were few repeated observations of the procedure and few independent performances as well. Almost half of them were strongly agree that the sequence of training was good.

Concerning the Tutees focus of attention, there were strongly agreements between the highest percentages of them that Tutors' instructions on the procedure were helpful, Tutees' commenting on the procedure was helpful, and that the current method grasping the students' attention. These findings may be justified by conducting the modified Peyton's four step approach session in small groups "only seven students" (six Tutees and one Tutor), who have the same level of experience. Each student has the ability to see the tutor during the demonstration of the procedure and each one of them had an equal chance to re-demonstrate it, to instruct his peer to perform the neonatal CPR procedural steps and ask question, in addition, face to face interaction, and discussion were allowed to all students. These findings were in line with **Giordana and Wedin (2010)**, who found that PL strategy made tutee students more actively engaged in the learning process [33]. In this respect, **Archer et al (2015)**, conducted study entitled "In search of an effective teaching approach for skill acquisition and retention: teaching manual defibrillation to junior medical students" found that feedback was given mainly by peers under educator supervision is considered the critical component leading to effective learning in a simulation-based learning environment [31]. Furthermore, **Ng JY (2014)** documented the same results [34]. In everyday life the students continually learn from each other. Self-confidence and lesser anxiety are combined gift from PL process and the repetition of the steps under constructive feedback enhancing the students experience as well (**Mc-Lelland et al, 2013**) [17].

As regards the Tutees comprehension of the didactic approach, the current study revealed that it was obvious that vast majority of the Tutees students were strongly agree that the present approach made them feel confident in performing the procedure independently and created conducive environment for learning. Moreover, around two thirds of them were also strongly agree that modified Peyton's four step approach decreased students' anxiety during the procedure and increased their ability to comprehend the procedure better.

These findings may be attributed to that during the modified Peyton's four-step approach session, the Tutee students observed the others' performance, detected their mistakes, corrected and commented on them which in turn made them avoid making the same mistakes later on. Additionally, Tutee students' confidence may be enhanced due to being active and independent participant during PL and not only observing the performance of the procedure and informing them that the procedure was for learning purpose only and not for evaluation that created conducive learning atmosphere and decreased their anxieties and comprehend the procedure better.

On the other hand, three quarters of them were disagreed to some extent that the time expenditure was suitable. This finding could be interpreted in the light of that this is the first experience of the students to act either as Tutors or Tutees and they need more training to conduct the current learning process competently without time consuming as well as with a high quality. Similar findings were reported by **Nikendei et al (2014)** [12].

To sum up, modified Peyton's four-step approach naturally employs different strategies to address learner habits. The first three phases (demonstration, deconstruction, and comprehension) address different cognitive pathways. The demonstration requires the learner to be attentively watching, while the deconstruction requires simultaneous active listening and reflection, and the comprehension phase occurred when the learner guides his peer to perform the skills and ensure that the learner has understood. Then, the learner assimilates what is shown and what is explained after constructive feedback from both tutor and other tutee till reach competent performance. Community health and pediatric nurse educators always adopting new and innovative teaching strategies because they facing a lot of difficulties in their clinical teaching environment, as they always act with lay people, illiterate, and fighting myths and rumors, so they act to prepare their students and equip them by the innovative strategies to be used at different situation that they may face.

5. Conclusion and Recommendations

It can be concluded that applying modified Peyton's four-step approach by peers as an innovative clinical teaching method has a positive effect on the clinical performance of the pediatric nursing students immediately after teaching as they exhibit higher competency in performing neonatal CPR procedure than students who taught through traditional learning. Additionally, it contributes to improve the students' satisfaction level in performing neonatal CPR procedure among both Tutors and Tutees students. Thus, this study **recommended** that;

- Apply modified Peyton's four step approach by peers as an innovative method of teaching in all academic nursing departments at the Faculty of Nursing, Alexandria University and Damanhour University.
- Develop workshops or training programs for all nurse educators about modified Peyton's four step approach to help students apply it effectively with their peers.
- Replicate the study on larger number of students.

- Include modified Peyton's four step approach as an innovative method of clinical teaching in the curricula of undergraduate program.

Acknowledgement

Our deep gratitude goes to our study subjects who volunteered and give us all the relevant information.

Conflict of interest

The authors declared that they have no conflict of interest.

Author contribution

All authors were part of the initial design of the research. They shared in collected and analyzed the data, wrote and edited the final version the text of the manuscript and formatted it and submitted it for publication.

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