

## The Changes on Knowledge, Confidence and Skills accuracy of Nursing students at a Simulated based setting versus Traditional during Neonatal Resuscitation

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**Abstract:** In recent decades nursing educators have tended to use simulation rather than traditional methods in clinical setting to encourage active learning and enhance students' clinical reasoning, decision making and achieve the great improvement of knowledge and clinical skills through clinical life support skills. The **aims** of this study was to examine the changes on knowledge, confidence and skills accuracy of nursing students at a simulated based setting versus traditional during neonatal resuscitation. **Methods:** A quasi experimental pre, post and follow up test were done on 100 of undergraduate pediatric nursing students who were selected randomly and enrolled equally in simulated based and traditional based group for neonatal resuscitation skill performance during the first semester of academic year 2014-2015 at pediatric nursing department, Mansoura University. Four tools were used to collect data regarding Sociodemographic, knowledge, skill performance and confidence of pediatric nursing students. **Results:** there were statistical significant differences regarding students clinical performance, knowledge and confidence in simulated compared to traditional learning experience either immediately or 3 months later than before the intervention. **Conclusion:** simulation results in increased knowledge, skill performance and self-confidence of nursing students related to neonatal resuscitation. **Recommendation:** The results recommended further researches to examine the effect of simulation on assessing different learning outcomes to provide more evidence that simulation would be valuable for students development.

**Key word:** Simulation, Knowledge, Skill performance, Self- confidence, Neonatal resuscitation, Nursing students.

### INTRODUCTION

Learning in the clinical practice is an important component of nursing education considering that nursing is practice-based profession. The quality of nurse education depends largely on the quality of the clinical experience that student nurses receive in the clinical environment (Ip and Chan 2005). Most of newly graduated pediatric nurses do not have the required skills to perform psychomotor procedures resulting from difficulty in finding a safe clinical environment in crowded pediatric units of children's hospitals, where it is possible to provide good clinical experiences for students during the limited time of nursing education ( Bultas,2011 ).

Furthermore, most children who are being hospitalized suffer from acute illnesses, and for the child's safety parents and staff prohibit some activities from being done by students (Suplee and Solecki,2011). Therefore nursing instructors who have the responsibility to provide rich clinical experiences for students and a safe care for children and their families seek additional non-traditional methods to enhance the clinical experiences of students (Henderson et al,2012) . Traditionally nursing students receives most of their clinical experience within the academic school of nursing on clerkships in the discipline of pediatric nursing. The educational limitations of the traditional approach pointed out the difficulty of using traditional learning in practical setting using static manikins . In hospital training setting students gain direct clinical experience by observing and participating in child care under the supervision of faculty or resident staff that lack interaction with patients

and decision making regarding child health sate (Sinclair and Ferguson,2009).

The American Association of Colleges of Nursing (2009) acknowledged that educators are expected to produce learning environments that facilitate critical thinking and reflection while preparing nurses for practice. Simulation is an effective means for measuring clinical performance across many aspects of nursing care and represents an integrative approach to understanding the risks or potential risks to patient safety and the effectiveness of nursing interventions (Binstadt et al., 2007). simulation refers to those activities that reflect the reality of a clinical environment. In other words, it includes activities such as role-playing, and using interactive videotapes and mannequins that help students in learning. Simulated based learning refers to structured student learning experiences with the use of a technologically advanced computerized mannequin, the Human Patient Simulator (HPS) that imitates child condition with physiological responses (Haidar,2009). Students are administered sequential decision-making events within an environment that mimics a clinical setting. Instructors can control the mannequin's responses to be responded to interventions provided by the student (Nagle et al., 2009) .

In order to become competent practitioner, student nurses need to be guided and supervised. Supervision of nursing students in clinical practice plays a significant role in nursing profession as it has an influence on the students learning of the knowledge and skills. It is suggested that students have to be given opportunities to practice different

tasks to gain confidence, become perfect and learn from the mistakes they will make. Learning in clinical practice takes place if students know what they are doing is right or wrong. This is done through feedback that is provided to students from educators during clinical learning to know their progress ( Kaddoura, 2010) .

One of the most common and important nursing skills which is performed by nurses, and considered as the most challenging skills taught in pediatric nursing department is cardiopulmonary resuscitation as a basic life support in pediatric particularly neonates, it can associated with serious side effects in case of any mistakes (Tawalbeh and Tubaishat,2013 ). Nursing students always try to gain confidence in performing this skill in a safe way with minimal damage and stress. In fact success in this skill requires not only knowledge of the techniques and skills in performing its steps but also requires confidence that can be achieved through practice (Dowson et al, 2013).

Three important variables have been selected to be the focus of this study: knowledge, clinical performance and confidence. Nursing knowledge and clinical performance are the basis for undergraduate education and determine the level of competence with which the new graduate enters the workforce. Considering students' self-confidence in pediatric clinical training is of great importance, because students are often anxious as their patients being smaller and more delicate than adults which is stressful and threatening for nursing students. Simulation in pediatric clinical nursing education allows students to actively learn and develop confidence in pediatric nursing care without the fear of putting the patient at risk ( Coolen et al, 2012) .

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

Simulation is a risk-free approach to learning using a device to emulate a real patient situation for learning. Simulation is designed to encourage active learning and enhance students' clinical reasoning and decision making, and achieve the great improvement of knowledge and clinical skills. In faculty of nursing, Mansoura University because of the large demand for clinical placements and a reduced number of academic clinical staff, opportunities for nursing students to participate in patient care and work in clinical situations have also decreased. Hospitals in Mansoura city are crowded with medical and nursing students, which may affect the quality of education. As the use of simulation has increased, there is a question about whether simulation-based learning actually demonstrates more effect on improving learners' knowledge, skills and confidence compared with the traditional techniques in nursing education.

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

The aim of this study was to examine the changes on knowledge, confidence and skills accuracy of nursing students at a simulated based setting versus traditional during neonatal resuscitation.

#### **Research Questions:**

- a. Are their changes in knowledge between nursing students exposed to a traditional clinical experience and those exposed to simulation experiences?

- b. Are their changes in clinical performance between nursing students exposed to a traditional clinical experience, and those exposed to simulation experiences?
- c. Are their changes in the levels of confidence between nursing students exposed to a traditional clinical experience, and those exposed to simulation experiences?

#### **Subjects and Methods:**

##### **Design:**

A quasi- experimental design was used. A pre–post–follow up test was used.

##### **Setting:**

This study was conducted in pediatric nursing department, faculty of nursing in Mansoura University that offers a bachelor degree in nursing program using credit hour system that is accredited at the national level. The school of nursing contains many classrooms that are equipped with computers for PowerPoint presentations and eight skill laboratory rooms are equipped with the essential equipment , adult and pediatric simulators, computers, cardiac monitors and ventilators used to enhance the clinical skills of students.

##### **Subjects and Sampling Technique:**

A random sampling technique was used to recruit the pediatric nursing students who participated in this study from the total population of 250 pediatric nursing students that divided into ten alphabetical groups during the academic year 2014-2015. Four clinical groups were chosen by cluster randomization, a coin was tossed for each odd number group and its allocation was randomly determined, the next group was allocated to the opposite limb of the study. A sample of 100 pediatric nursing students were selected after fulfilling the following criteria: he or she agreed to participate and did not attend this course before and assigned into two groups:

- a. Simulated learning group contain 50 students studied skills on a simulation scenario related to neonatal resuscitation on a simulated Simbaby.
- b. Traditional learning group contain 50 students studied skills demonstration on a static manikin using the traditional approach .

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

Four tools were used, three of them were developed by the researcher after reviewing the related literatures.

**Tool I:Student's Sociodemographic questionnaire:** include data about age, sex, residence and Marital status.

Tool II: Neonatal Cardiopulmonary Resuscitation knowledge questionnaire( pre, post follow up format): 23 multiple choice questions covers all knowledgeable items of Neonatal Cardiopulmonary Resuscitation developed by the researcher to assess the students' knowledge after reviewing relevant literature, and was revised by pediatric nursing experts. The total scores of the factual knowledge ranged from 0 to 23, one point for each correct answer. Students level of knowledge was classified into: good(75% and more) fair (50% to less than 75%) and poor(less than 50%).

Tool III: Neonatal Cardiopulmonary Resuscitation checklist (pre- post- follow up format). Developed by the researcher to assess the students' performance of Neonatal Cardiopulmonary Resuscitation that is already included in pediatric nursing clinical book that developed by pediatric nursing staff which updated every year after reviewing related literature. It consisted of 23 steps. These steps were positively marked with zero mark for not done, one mark for each incompletely done step and 2 marks for each completely done step. The possible total scores of the factual performance ranged from 0 to 42, that categorize students performance into: good(75% and more), satisfactory( 50% to less than 75%)and unsatisfactory( less than 50%).

**Tool IV: Self-confidence Scale** (pre- post – follow up format) :A Likert-type self-confidence scale (Hicks, 2006) consisting of 12 items that measures degree of students self-confidence about neonatal resuscitation. The response option of each item ranges from (0) to not at all confident to (4) very confident, with higher scores indicating greater self confidence. The Cronbach's alphas of the scale on the current data were 0.93 for pretest and 0.96 for posttest, which demonstrates high internal consistency reliability. Scoring system categorize students self-confidence level into: very confident(75% and more),moderately confident(50% to less than 75%) and non confident (less than 50%).

**Procedure:**

- a. An official permission was obtained from the dean of faculty of nursing Mansoura University after clarifying the purpose of the study, setting the time for beginning the study.
- b. All participants were entirely voluntary and had the freedom to withdraw from the study at any time, confidentiality and autonomy were assured . After giving informed consent from students, random selection was used to determine group composition to one of the two( simulated- traditional) practicum experiences.
- c. Each student in both group was observed while performing neonatal resuscitation procedures on the static manikins from the initiation of the procedure till its termination to assess his/her implementation of the procedure
- d. Measurements of knowledge acquisition and self-confidence were taken before beginning the didactic portion of the course.
- e. Implementation of the intervention were done as the following

**A. In simulated group :**

- a. The knowledge section consisted of definition of neonatal resuscitation, preparation for resuscitation, neonatal flow algorithm and resuscitation procedure that explained all steps of practice with each rationale, dangers of chest compression, post resuscitation care and finally ethical aspect related to resuscitation. This part was presented by using face to face lecture and power pint.
- b. Performance section consisted of demonstration of neonatal resuscitation procedure in pediatric nursing laboratory using Simbaby. The Simbaby is attached

with monitor that provides feedback about heart rate and O2 saturation after each intervention.

- c. The procedure classified into assessment, preparation, implementation, post care, and documentation, through exposing students to a variety of neonatal cardiopulmonary resuscitation scenarios that emphasized assessment and fundamental intervention that developed by the researchers such as:
  - a) A neonate immediately after birth is not able to initiate breathing with heart rate less than 100 b/m and cyanosed.
  - b) The initial steps help the neonate to start spontaneous breathing but still having apnea with heart rate less than 100 and cyanosed.
  - c) After 30 second of effective bag and mask ventilation with 100% oxygen and heart rate is below 60 b/m.
  - d. Each scenario take approximately 5 to 15 minutes, during this time the students were able to ask questions about the neonate such as ante natal and intra natal history; perform initial steps for resuscitation including measures to prevent heat loss, opening air way, dry, tactile stimulation, reposition and evaluating respiration, heart rate and color. Provide interventions, including starting the positive pressure ventilation, chest compression and give the medication. The student performance in the previous scenarios was evaluated by using the neonatal resuscitation checklist

**B. In the traditional group:**

- a. The students were studying the knowledge section using traditional method of teaching: using face to face lecture and power pint. The theoretical content was identical to that was given to the simulated group
- b. Performance section consisted of demonstration of neonatal resuscitation procedure in pediatric nursing laboratory using static manikins including assessment, preparation, implementation, post care, and documentation.
- c. Immediate knowledge test, performance checklist and self confidence scale were administered at the end of the study for both groups to measure mastery of the instructional materials of neonatal resuscitation.
- d. After three months both groups were exposed to knowledge, performance test and self confidence scale to measure knowledge retention, practical and self-confidence acquisition.

**Limitation of the study:**

It was difficult to ambulate the Simbaby to place it under radiant warmer due to the present of its connected line.

**Statistical analysis:**

The collected data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 16, SPSS Inc. Chicago, IL, USA). For quantitative data, mean and standard deviation level of total confidence, knowledge and performance were calculated. For qualitative data, comparison between two groups and more was done using Chi-square test ( $\chi^2$ ). For comparison between means of two groups, parametric analysis (t-test) and non-parametric analysis (Z value of Mann-Whitney U test) were used. For comparison between more than two means of parametric data, F value of ANOVA test was calculated for parametric

data, where Scheffe test was performed to compare between each two means if F value was significant. Correlation between variables was evaluated using Pearson's correlation coefficient ( $r$ ). Significance was adopted at  $p < 0.05$ .

## RESULTS

Characteristics of the studied nurses are illustrated in table (1). It was found that half of the studied students in the traditional group were at age 21 years old compared to 40% for the students in the simulated group with mean age of  $20.86 \pm 0.70$  and  $20.68 \pm 0.71$  respectively, with no statistical significant difference. The majority of the studied students were female (76% and 80% in the traditional and simulated group respectively) and single (86% in traditional and 82% in simulated group). The highest percentage of the students did not have past experience about neonatal cardiopulmonary resuscitation (82% for each group).

Table (2) clarifies the mean scores of total knowledge of the study nurses students about neonatal resuscitation at simulated group versus traditional group. It was observed that the mean score of the knowledge in both groups pre the intervention were approximately similar ( $10.12 \pm 2.42$  for traditional group and  $10.40 \pm 2.77$  for the simulated group). No statistically significant difference was found ( $P = 0.592$ ). Immediately after the intervention the mean scores for the two groups improved to  $17.70 \pm 2.82$  and  $20.08 \pm 1.71$  for traditional group and simulated group respectively, with statistical significant difference between the two groups. Three months later, the mean score of the knowledge of the traditional group were the same compared to  $19.94 \pm 1.80$  for the simulated group and difference was statistically significant between the two groups. The Mean score of change of knowledge after 3 months than pre in the traditional group was  $7.26 \pm 3.61$  compared to  $9.94 \pm 3.51$  in the simulated group, with statistical significant difference ( $P = 0.002$ ).

Figure(1) shows that more than half of both groups had "Poor" level of total knowledge before the intervention (66% for the traditional group and 64% for the simulated group). While, immediately after the intervention and 3 months later none of the studied student nurses had "Poor" level of total knowledge (0% for each in both groups).

Mean score of total clinical performance between experimental group and traditional group presented in table (3). The findings indicate that mean scores of total clinical performance of the studied nurses in the traditional group was  $8.96 \pm 4.90$  pre the intervention and this score improved in both immediate and after 3 months of the intervention to  $22.92 \pm 8.00$  and  $21.84 \pm 7.09$  respectively. There was statistical significant difference between pre the intervention and both immediately after the intervention and after 3 months later ( $P = 0.0001$ ). On the other hand, the mean score of total clinical performance of the studied nurses in the simulated group was  $7.10 \pm 4.03$  pre the intervention and this score increased to  $37.06 \pm 5.82$  and  $36.74 \pm 5.56$  in both immediate and after 3 months of the intervention respectively. Also there were statistically significant differences between the traditional and simulated group ( $P =$

$0.0001$ ). The Mean score of change of clinical performance after 3 months than pre in the traditional group was less than  $1.86 \pm 5.88$  compared to  $14.14 \pm 9.86$  in the simulated group, with statistical significant difference ( $P = 0.0001$ ).

Regarding level of total performance, all of the studied student nurses had "Unsatisfactory" performance scores (100% for both groups) before the intervention. Immediately after the intervention this percent reduced to 52% for the traditional group and 0% for the simulated group and to 58% and 0% for the traditional and simulated group respectively three month later as illustrated in Figure (2).

The Mean scores of total confidence scale of the studied nurses' students about neonatal resuscitation are presented in table (4). It was revealed that mean scores of total confidence of the studied nurses in the traditional group was  $16.64 \pm 5.24$  pre the intervention and this score improved in both immediate and after 3 months of the intervention to  $26 \pm 5.81$  and  $24.78 \pm 5.16$  respectively. There is statistical significant difference between pre the intervention and both immediately after the intervention and after 3 months later ( $P = 0.0001$ ). On the other hand, the mean score of total confidence of the studied nurses in the simulated group was  $15.46 \pm 5.69$  pre the teaching intervention and this score increased to  $32.80 \pm 3.94$  and  $32.32 \pm 3.72$  in both immediate and after 3 months of the intervention respectively. Also there were statistically significant differences between the traditional and simulated group as regard the mean score of changes after three months than pre ( $P = 0.0001$ ).

Figure (3) represents that none of nurses in both groups were very confident before the intervention (0.0% for both groups) and this percent increased immediately after the intervention to 54% for the traditional group and 94% for simulated group and changed to 36% and 94% respectively after 3 months of the intervention in both group.

Table (5) represents correlation between scores of change post 3 months than pre of confidence scale, knowledge and clinical performance of pediatric nurses students at simulated group versus traditional group. It is clear from the table that there were statistical significant differences between Clinical performance and knowledge in both groups ( $P = 0.0001$  in the traditional group and 0.009 in the simulated group).

Figure(4) It is clear from this figure that there was statistical significant difference as regard correlation between scores of change post three months than pre between knowledge and clinical performance of pediatric nursing students exposed to traditional clinical experience,  $p < 0.0001$ .

Figure(5) represent correlation between scores of change post 3 months than pre of knowledge and clinical performance of pediatric nurses students exposed to simulated clinical experience. It is clear that there was statistical significant difference between knowledge and clinical performance in the simulated group,  $p < 0.009$

Table (1): Basic data of the studied pediatric nursing students at a simulated based setting versus traditional neonatal resuscitation (n=100).

| Variables                          | The studied nurses at neonatal resuscitation setting (n=100) |      |   |      | $\chi^2$ | P     |
|------------------------------------|--|------|---|------|----------|-------|
|                                    | Exposed to traditional clinical experience (n=50)            |      | Exposed to simulated based setting (n=50) |      |          |       |
|                                    | n  | %    | n   | %    |          |       |
| <b>•Age (years):</b>               |  |      |   |      |          |       |
| 20                                 | 16   | 32.0 | 23  | 46.0 | 2.062    | 0.357 |
| 21                                 | 25   | 50.0 | 20  | 40.0 |          |       |
| 22                                 | 9  | 18.0 | 7   | 14.0 |          |       |
| <b>Range</b>                       | 20-22  |      | 20-22                                     |      |          |       |
| <b>Mean ±SD</b>                    | 20.86±0.70   |      | 20.68±0.71                                |      |          |       |
| <b>t-test</b>                      | 1.274  |      |   |      |          |       |
| <b>P</b>                           | 0.205  |      |   |      |          |       |
| <b>•Sex:</b>                       |  |      |   |      |          |       |
| Male                               | 12   | 24.0 | 10  | 20.0 | 0.233    | 0.629 |
| Female                             | 38   | 76.0 | 40  | 80.0 |          |       |
| <b>•Residence:</b>                 |  |      |   |      |          |       |
| Rural                              | 24   | 48.0 | 27  | 54.0 | 0.360    | 0.548 |
| Urban                              | 26   | 52.0 | 23  | 46.0 |          |       |
| <b>•Marital status</b>             |  |      |   |      |          |       |
| Single                             | 43   | 86.0 | 41  | 82.0 | 0.298    | 0.582 |
| Married                            | 7  | 14.0 | 9   | 18.0 |          |       |
| <b>•Past experience about CRP:</b> |  |      |   |      |          |       |
| <b>Yes</b>                         | 9  | 18.0 | 9   | 18.0 | 0.000    | 1.000 |
| <b>No</b>                          | 41   | 82.0 | 41  | 82.0 |          |       |

Table (2): Mean scores of total knowledge of the studied pediatric nursing students about neonatal resuscitation at a simulated based setting versus traditional neonatal resuscitation pre, immediately post and post 3 months (n=100).

| Total knowledge about neonatal resuscitation        | Mean scores of total knowledge of the studied nurses at neonatal resuscitation setting (n=100) |   | t-test | P       |
|---|--|---|--------|---------|
|   | Exposed to traditional clinical experience (n=50)  | Exposed to simulated based setting (n=50)                       |        |         |
|   | Mean ±SD   | Mean ±SD  |        |         |
| <b>Pre (I)</b>                                      | 10.12±2.42   | 10.40±2.77  | 0.538  | 0.592   |
| <b>Immediate post (II)</b>                          | 17.70±2.82   | 20.08±1.71  | 5.097  | 0.0001* |
| <b>Post 3 months (III)</b>                          | 17.38±2.62   | 19.94±1.80  | 5.686  | 0.0001* |
| <b>F value</b>                                      | 133.007  | 333.528   |        |         |
| <b>P</b>  | 0.0001*  | 0.0001*   |        |         |
| <b>Sheffe test</b>                                  |  |   |        |         |
| <b>P</b>  | I vs II, P=0.0001*<br>I vs III, P=0.0001*<br>II vs III, P=0.831                                | I vs II, P=0.0001*<br>I vs III, P=0.0001*<br>II vs III, P=0.948 |        |         |
| <b>Mean score of change after 3 months than pre</b> | ↓1-16<br>7.26±3.61   | 3-19<br>9.54±3.51   |        |         |
| <b>Z value</b>                                      | 3.090  |   |        |         |
| <b>P</b>  | 0.002*   |   |        |         |

\*Significant (P<0.05)

Z value of Mann-Whitney test

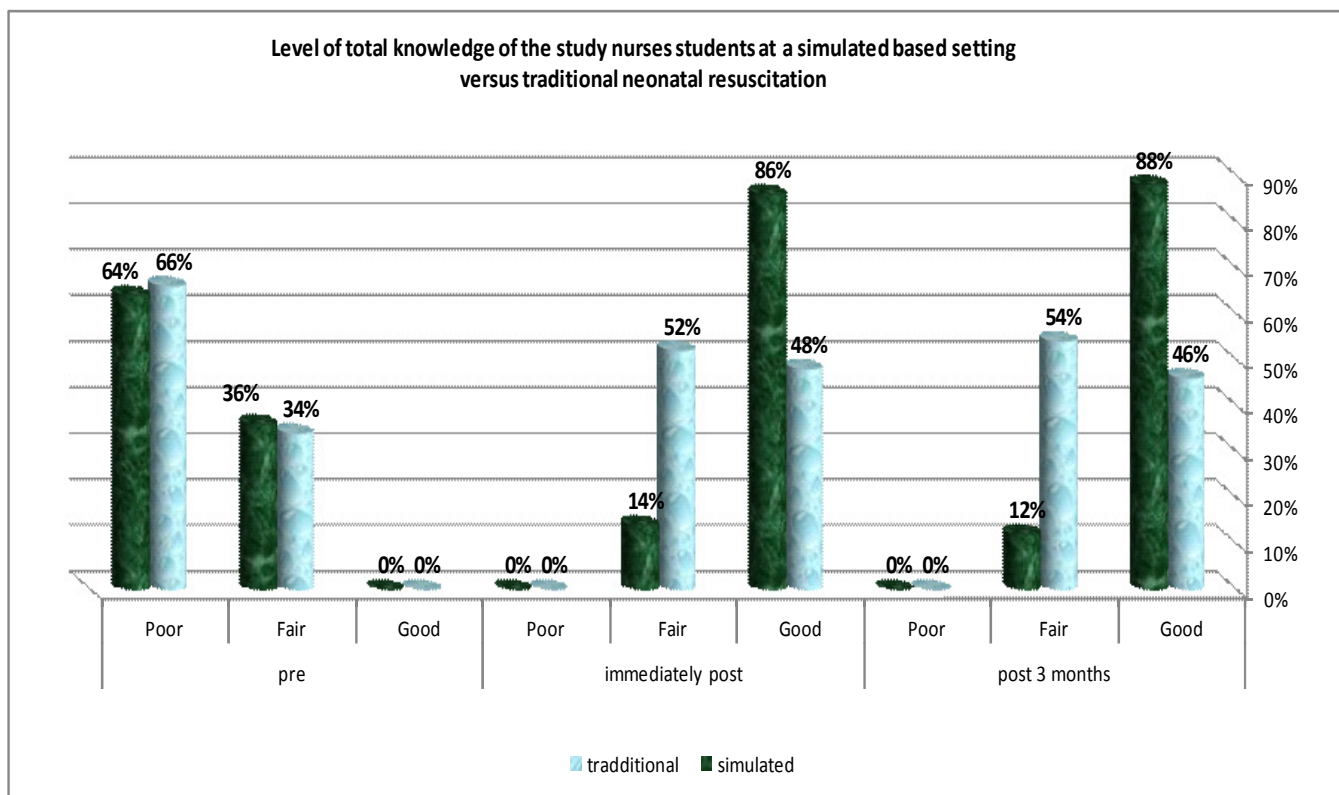


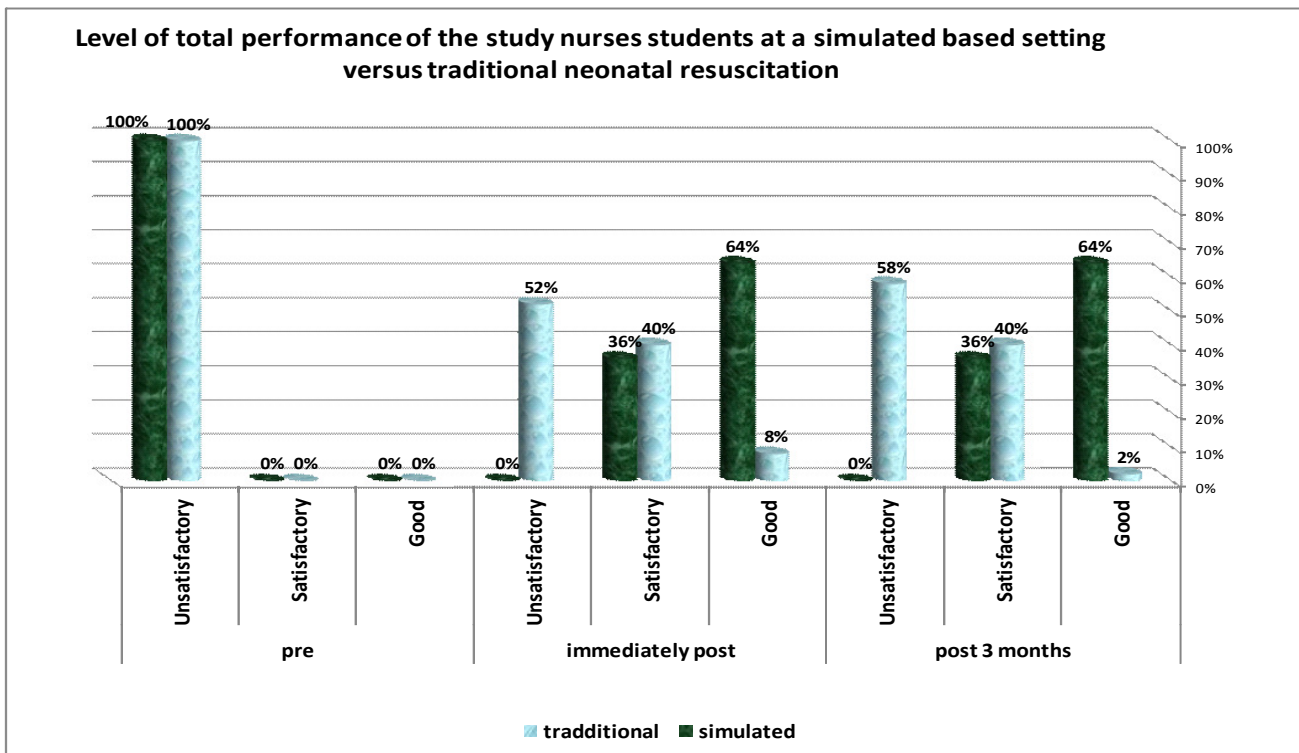
Figure (1) Level of pediatric nurses knowledge before, immediately post and after three months in simulated versus traditional setting.

Table (3): Mean scores of total clinical performance of neonatal resuscitation of the studied pediatric nursing students at a simulated based setting versus traditional neonatal resuscitation pre, immediately post and post 3 months (n=100).

| Total clinical performance of neonatal resuscitation | Mean scores of total performance of the study nurses at neonatal resuscitation setting (n=100) |   | t-test | P       |
|--|--|---|--------|---------|
|  | Exposed to traditional clinical experience (n=50)  | Exposed to simulated based setting (n=50) |        |         |
|  | Mean ±SD   | Mean ±SD                                  |        |         |
| Pre (I)  | 8.96±4.90  | 7.10±4.03                                 | 2.072  | 0.041*  |
| Immediate post (II)                                  | 22.92±8.00   | 37.06±5.82                                | 10.110 | 0.0001* |
| Post 3 months (III)                                  | 21.84±7.09   | 36.74±5.56                                | 11.696 | 0.0001* |
| F value  | 65.450   | 548.229                                   |        |         |
| P  | 0.0001*  | 0.0001*                                   |        |         |
| Sheffe test  | I vs II, P=0.0001*   | I vs II, P=0.0001*                        |        |         |
| P  | I vs III, P=0.0001*  | I vs III, P=0.0001*                       |        |         |
|  | II vs III, P=0.729   | II vs III, P=0.954                        |        |         |
| Mean score of change after 3 months than pre         | ↓15-9<br>↓1.86±5.88  | ↓6-36<br>14.14±9.86                       |        |         |
| Z value  |  | 52.927                                    |        |         |
| P  |  | 0.0001*                                   |        |         |

\*Significant (P<0.05)

Z value of Mann-Whitney test



Figure(2): Pediatric nurses performance accuracy before, immediately post and after three months in simulated versus traditional setting

Table (4): Mean scores of total confidence scale of the studied pediatric nursing students at a simulated based setting versus traditional neonatal resuscitation pre, immediately post and post 3 months (n=100).

| Total confidence scale regarding neonatal resuscitation | Mean scores of total confidence of the studied nurses at neonatal resuscitation setting (n=100) |   | t-test | P       |
|---|---|---|--------|---------|
|   | Exposed to traditional clinical experience (n=50)   | Exposed to simulated based setting (n=50) |        |         |
|   | Mean ±SD  | Mean ±SD                                  |        |         |
| Pre (I)   | 16.64±5.24  | 15.46±5.69                                | 1.078  | 0.284   |
| Immediate post (II)                                     | 26.00±5.81  | 32.80±3.94                                | 6.803  | 0.0001* |
| Post 3 months (III)                                     | 24.78±5.16  | 32.32±3.72                                | 8.384  | 0.0001* |
| F value   | 66.351  | 236.944                                   |        |         |
| P   | 0.0001*   | 0.0001*                                   |        |         |
| Sheffe test   | I vs II, P=0.0001*  | I vs II, P=0.0001*                        |        |         |
| P   | I vs III, P=0.0001*   | I vs III, P=0.0001*                       |        |         |
|   | II vs III, P=0.534  | II vs III, P=0.870                        |        |         |
| Mean score of changes after 3 months than pre           | ↓13-25<br>8.14±7.03   | 0-36<br>16.86±6.41                        |        |         |
| Z value   | 31.839  |   |        |         |
| P   | 0.0001*   |   |        |         |

\*Significant (P<0.05)

Z value of Mann-Whitney test

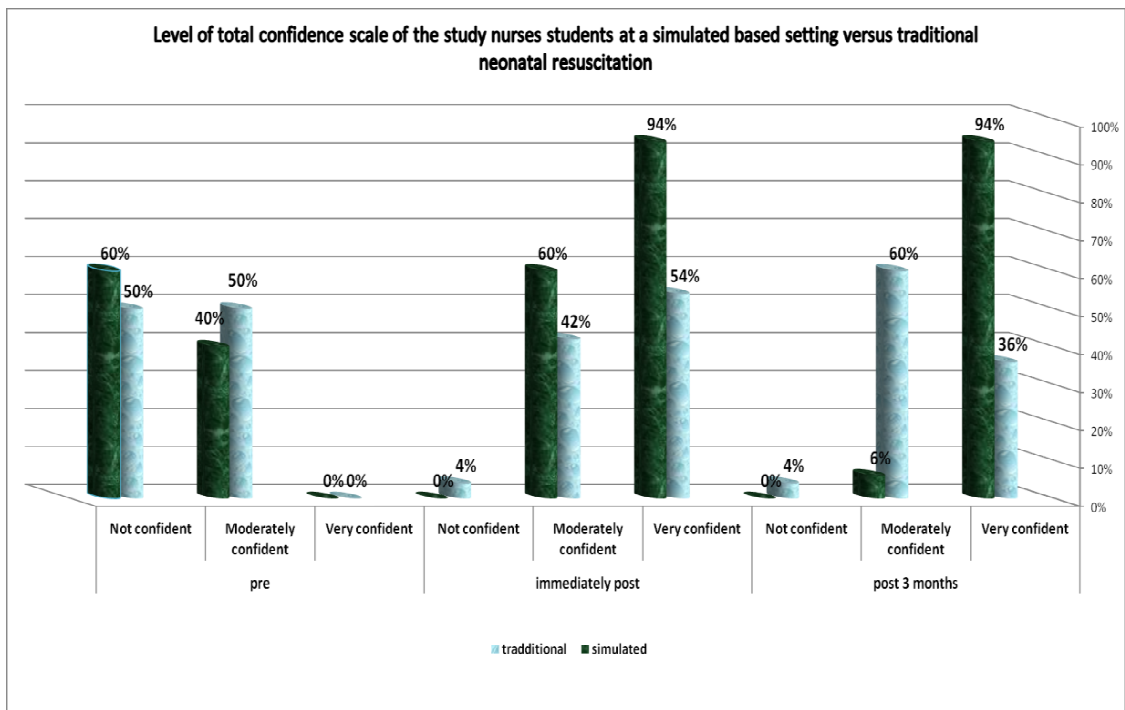


Figure (3) Level of pediatric nurses confidence before, immediately post and after three months in simulated versus traditional setting

Table (5): Correlation between scores of change post 3 months than pre of confidence scale, knowledge and clinical performance of the studied pediatric nursing students at a simulated based setting versus traditional neonatal resuscitation (n=100).

| Scores of change post 3 months than pre | Mean scores of the studied nurses at neonatal resuscitation setting (n=100) |                  |   |                 |
|---|---|------------------|---|-----------------|
|   | Exposed to traditional clinical experience (n=50)                           |                  | Exposed to simulated based setting (n=50) |                 |
|   | Confidence scale  | Knowledge        | Confidence scale                          | Knowledge       |
|   | r<br>P  | r<br>P           | r<br>P                                    | r<br>P          |
| <b>Knowledge</b>                        | -0.004<br>0.980   | -                | -0.054<br>0.708                           | -               |
| <b>Clinical performance</b>             | -0.023<br>0.872   | 0.723<br>0.0001* | -0.142<br>0.324                           | 0.366<br>0.009* |

\*Significant (P<0.05)

r=Correlation Coefficient



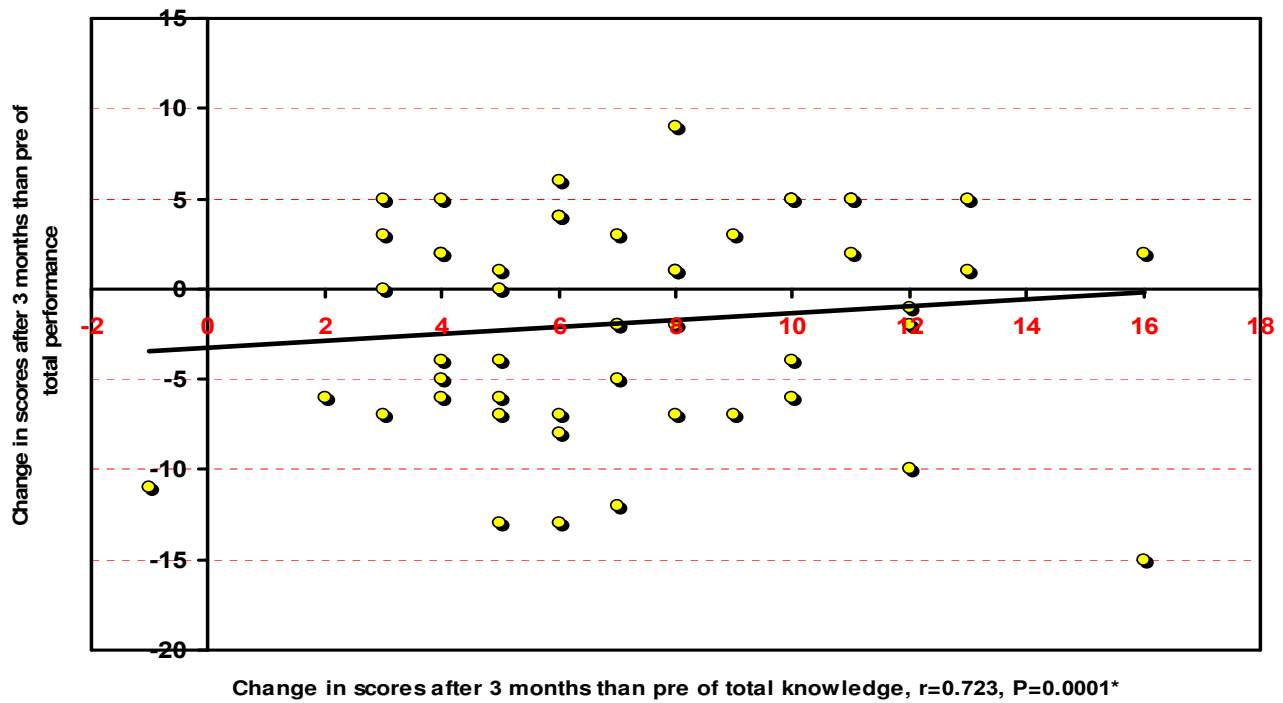


Figure (4): Correlation between scores of change post 3 months than pre of knowledge and clinical performance of neonatal resuscitation of the study nurses students exposed to traditional clinical experience (n=50).

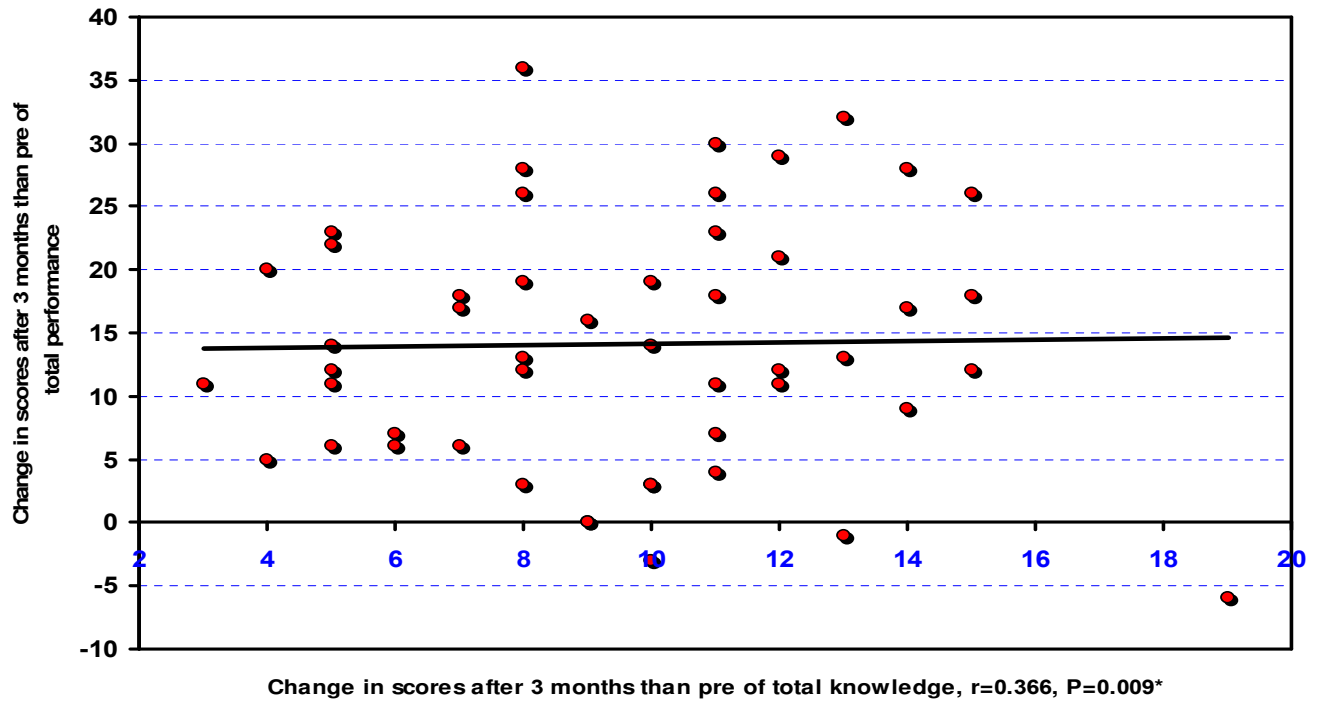


Figure (5): Correlation between scores of change post 3 months than pre of knowledge and clinical performance of neonatal resuscitation of the study nurses students exposed to simulated clinical experience (n=50).

## DISCUSSION

Learning strategy using simulation may help meet the need for creative methods to educate nursing students by creating experiences for clinical learning without increasing the number of clinical sites or nurses to monitor students (Richards *et al*, 2010). Simulations are designed to amplify,

mimic or replace real-life situations, giving participants opportunity to reason their way through clinical problems and make decisions, without the potential for harming actual patients (Thomas and Mackey, 2012).

The results demonstrated homogeneity between the students in both group with statistical significant difference between

them(table 1). This explained students were eager to commit themselves to the study and made positive comments about the opportunity to practice clinical skills in a safe environment, also they reported that the training sessions with specific and direct feedback on clinical skills and problem management motivated them to improve their practice and increase their confidence

The present study indicated a significant effects of simulation on pediatric nurses knowledge about neonatal resuscitation in the simulated group than traditional in the form of increasing mean score of knowledge immediately post and three month later in simulated group than traditional group (table 2 ). This difference may due to simulation environment stimulates visual, auditory, and tangible learning methods and elicits different compared with the superficial responses obtained from traditional lectures . This results in accordance with Tawalbeh and Tubaishat( **2013**)who stated that simulation has a significant effects of on knowledge. Also Shinnick and Evangelista (**2012**) emphasized the importance of simulation as an effective means of providing a realistic and practical environment. In addition the simulation scenario was followed by debriefing sessions that clarified students' mistakes, helping to improve students' knowledge . This is consistent also with the study by Akhu-zaheya,Gharaibeh and Alost ( **2013**) who concluded that debriefing helps students to decompress and integrate the experience into their knowledge base. The debriefing session may offer the opportunity for valuable reflective learning and clarification of the content and concepts provided during the simulation scenarios which could enhance learning experiences.

Our results show that all of the studied student nurses had "Unsatisfactory" performance before the intervention. Immediately and post 3 month of the intervention eight percent then two percent in the traditional group had good performance respectively compared to two third of the simulated group had good performance respectively .This differences due to the realistic real-time environment and the opportunity to give students feedback on clinical performance based on the scenario. The actual equipment, a Simbaby manikin and monitors which modeled physiological changes in vital parameters, provided a very authentic situation for the student as well as the presence of instructor in the room during the neonatal resuscitation. Previous studies reported the consistent findings. Kaddoura (**2010**) reported that simulation prepared new nursing graduates well to care confidently for critically ill patients, and helped them learn to make sound clinical decisions to improve patient outcomes. Another study found that students' performance was significantly improved in application of theoretical knowledge, health education and humanistic care after one-semester of simulation. The majority of students agreed that feedback sessions confirmed management of patients' problems, helped to develop rationale for actions (**Wotton et al , 2010**).

The current study indicated that simulation method in neonatal resuscitation leads to improvement in students confidence level immediately after the intervention in both group during neonatal resuscitation, this improvement become obvious statically significant in simulated group

than traditional group after three month of the study . This may result from presence of educator allowing students to practice in a safe environment by providing immediate feedback and instructions ranging from the simple to the complex that is deficit in traditional learning experience using demonstration and lecture through slides and images. This results is consistent with the finding of (Tiffen, Graf, and Corbridge, (**2009**) revealing that simulation has a significant and positive effect on the confidence levels of nursing students. In addition to study made by Porter et al, (**2013**) stated that students confidence in applying basic life support skills was significantly higher in the experimental group than the control group.

Training undergraduate nurses to respond appropriately to pediatric emergencies such as cardio respiratory arrest is one area that requires further attention. the importance of nurses being skilled at recognizing and managing seriously ill children should not be under-emphasized (**Mehta et al, 2006**). However, research suggests that nurses' skills in resuscitation are sometimes poor with one explanation offered being inexperience and lack of exposure . Simulation training offers a potential solution to this by allowing nurses to develop, learn and practice the required skills in a safe and supportive environment. Simulation can be used to improve confidence by teaching and reinforcing basic skills and critical thinking(**Soucy,2011**). The key points in this study were preparation for real life by giving nurses experience and insight into a pediatric emergency, and learning from mistakes, repetition and feedback. This was strongly supported by the fact that each session took place on the wards and real equipment had to be retrieved and used.

The traditional approach used for the students lacks the methods and opportunities to apply clinical skills that were available to the simulation group. This may explain the significant difference between the simulation based and the traditional based groups regarding neonatal resuscitation knowledge and practice in this study correlation . This may explain that simulation improve child safety and help the student nurse achieve competence through linking their theoretical knowledge with clinical practice. Simulation does not replace the need for learning in the clinical practice setting, but allows the student to develop their assessment, critical thinking and decision-making skills in a safe and supportive environment (**Vallizadeh et al., 2011**). This also allows for the assessment and evaluation of the student performance, if the student demonstrates a mistake, inaccurate patient assessment or slow clinical decision making, patient health is not affected and the student has the opportunity to learn from the experience (**Parker et al., 2011**).

Nurse educators are finding it increasingly more challenging to prepare undergraduate students for the ever-changing and more acute clinical environment. As an answer to this dilemma, the human patient simulator can provide students with the opportunity to enhance knowledge, to facilitate skill acquisition, to decrease anxiety, and to promote clinical judgment in a safe environment. These experiences assist the novice nursing student to progress to the advanced beginner stage of practice. In addition, the findings indicate

that simulation has a significant effect on knowledge retention. In the second posttest, the students in the simulated group were found to have significantly more knowledge compared with the traditional group. This is consistent with the findings of other studies (Brown *et al.*, 2012; Merchant, 2012) that showed a positive effect of simulation on knowledge acquisition and retention. This result could be explained by the fact that acquisition and retention of knowledge improved when education was maintained and supported by the active group experiences during the simulation.

From my opinion this experience provided students with the opportunity to problem-solve and engage in critical thinking, as well as practice technical skills safely. As the Simbaby exhibited signs of hypoxia and respiratory failure, students identified a change in vital signs and oxygenation. They were given the opportunity to make clinical judgments about the needed intervention. Students utilized communication skills in developing rapport with the simulator and instructor observed that students worked together as a team for the first time in a clinical situation. Blum, Borglund and Parcels, (2010) showed that using the simulation technique leads to satisfaction and self-confidence among students that has a significant impact on their understanding and feeling of success in their clinical practices. Also Franklin, (2013) observed a significant increase in the level of students' confidence who were trained clinical skills using simulation compared to the traditional training group in areas such as diagnosis and symptoms of disease, patient assessment, nursing interventions, and evaluation. However in the research by Brannan *et al.*, (2008) no significant difference was seen between self-confidence of the students who were trained acute myocardial emergency through simulation compared to those who were trained by lecture.

## CONCLUSION

The results of the present study showed that simulation results in increased knowledge, skill performance and self-confidence of nursing students related to neonatal resuscitation. The results provide evidence to support the integration of simulation as an effective teaching strategy that helps to improve students' knowledge and confidence in applying clinical skills. Also it provides nurse educators with the opportunity to provide students with realistic learning experiences in a safe environment. Simulation is an effective teaching strategy that can be adopted as an undergraduate teaching method.

## RECOMMENDATIONS

Based on the results of the study, it is recommended that:

Further researches to examine the effect of simulation on assessment different learning outcomes to provide more evidence that simulation would be valuable for students development.

Planning pediatric training courses for pediatric nursing students who are in close contact with patients, and for health care professionals who have an important responsibility in providing high quality services.

Further research is suggested regarding the effect of simulation on pediatric nursing students' skills related to emergency procedures in pediatric patients and its effect of increased self-confidence on students' skill

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