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# Effect of Using Simulation on the Performance of Nursing Students toward Postpartum Period

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**Abstract** ***Background:*** Using simulation as an educational tool in nursing education is not a new phenomenon. It becoming increasingly prevalent in the health care practice as there is inadequate opportunities for the nursing students to practice and refine psychomotor skills in care settings. So many institutions have a mission of producing qualified nurses with the requisite knowledge, attitudes and skills which done through adopted simulation models to improve the students' performance, promote their self-confidence and minimize the challenged that facing them during providing the clinical practices. This study aimed to assess the effect of using simulation on the performance of nursing students toward postpartum period. ***Methods:*** A nonequivalent control group pretest-posttest design was used which conducted at nursing skill lab of the Technical Health Institute affiliated to Minister of Health and Population in Mansoura, Egypt. Sample concluded of all enrolled students (130 females' students) in the academic year 2017/2018. One hundred students were in the experimental group and thirty students in the control group. **Tools:** Five tools were used for data collection: **1-** Self-administered questionnaire to assess students' socio-demographic data, and academic characteristics, **2-** Simulation-learning modules. **3-** Self-administered questionnaire sheet to assess students' knowledge regarding the postpartum period, **4-** Observation checklist to assess students' performance, **5-**Students' perception scale. ***Results:*** The present study revealed that although there was no statistically significant difference between control and experimental groups in the pretest ($p > 0.005$), but there was a statistically significant difference between them in the immediate and follow up posttest ($p<0.005$). ***Conclusion:*** This study concluded that the majority of students in the experimental group had higher scores of knowledge and performance than the control group in the immediate and follows up posttest. ***Recommendation:*** This study was recommended to apply simulation learning method in educating and training the nursing students in all different fields of the nursing education.

***Keywords:*** *simulation, postpartum period, knowledge, performance, nursing students*

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## 1. Introduction

The community health nursing became an important part of the health care, as the health care moves from hospitals to communities; this movement requires nurses with adequate skills and competency. So, the nurse can be able to deliver the health care services to all people in the community, promote their health, prevent illness, follow-up their treatment, educate the patients and change their behaviors. Although, the role of the nurses as promoters of health is more complex, but they need a multi-disciplinary knowledge, psychomotor skills and clinical experiences of health promotion in their nursing practice. [1,2,3]

Most newly graduated nurses do not have the required skills to perform psychomotor procedures effectively and facing many challenges in finding a safe clinical environment where it is possible to provide good clinical experiences. Consequently of rapid changes and complexity of the health care demands, a gap arose between clinical practice and theory in nursing education. So, using simulation as a teaching method can fills this gap in nursing education. [4,5,6]

Simulation-based clinical education in nursing is a powerful teaching approach which refers to a variety of activities using patient simulators, including devices, trained persons, lifelike virtual environments, and role-playing, not just handling mannequins. It provide the students with interactive manner for realistic clinical situations and engaged them in a safe learning environment without harmful for the patients. Also, it helped them to use a critical thinking and provided an opportunity for reflective learning and integrated their knowledge. [7,8,9,10]

Simulation in nursing education has a main advantages which included; help in reducing the possible harm to

living patient especially in a crisis situation, decreasing the pressure to perform quickly and efficiently practices without mistake through repeating the skills as many times as needed. Moreover, it enhances teamwork interaction, engaging nursing students in the clinical judgment, problem solving, decision making, effective communication and critical thinking. Provide student with immediate feedback, beside the opportunities to perform the rare and critical events in a safe and controlled environment. [11,12,13]

While, the disadvantages of using simulation in nursing education included: it cannot be substitute for real patient contact, highly costs, and consuming long time for designing and implementing it. Also, the simulation has lack of educators skills, training and experiences to design and implement simulations, fear of technology, preparing the technical skills schedule needing efforts and taking long time. Due to the impossibility to imitate actual physiological and psychological signs or symptoms of the illness, the nursing students cannot behave with the same way and clearly detected differences between the training device and the real situation. [13,14,15]

Postpartum period is considered a critical phase and window of opportunity for mothers and newborn health because of both mothers and newborns are vulnerable to illness and deaths during this period as about 65% of maternal and 75% of newborn deaths occur in the first seven days after the birth, around half of these deaths occur in the first 24 hours. A newborn baby is about 500 times more likely to die in the first day of their life than at one month of age. [16,17,18]

Postpartum period is defined as the period from childbirth to approximately six to eight weeks after delivery. It begins an hour following the birth of the fetus and expulsion of the placenta and reflects to approximate the time of healing and rejuvenation as the mother's body returns to pre-pregnancy states. It is an important time as the maternal health problems commonly observed in this period including postpartum hemorrhage, abdominal and back pain, abnormal discharge, puerperal sepsis and urinary tract complications. Also, psychological and mental health problems may be appeared such as postnatal depression. [19,20,21]

Paying attention and the effective care during this period can make a huge improvement in the life and providing good chances of women and children to survive life in the community as the early intervention and proper care can identify the danger signs, evaluate any deviation from expected recovery after birth, decrease the morbidity and mortality rate and prevent health problems from becoming chronic. So, lack of care may lead to serious threatening complications and missing the opportunities to promote healthy behaviors. But yet, this is the most neglected period for the provision of quality care. [16,22,23]

The postpartum period is a field where unexpected emergencies or the complications can occur due to many challenges that facing the nursing students which hindered them for providing of high quality care and limits their chance for hands-on care. This challenges may included: smaller hospitals size, shortages of obstetric hospitals, changes in resources, shortages of trained nursing staff, shorter of the length of maternal staying in the hospitals and low incidence of obstetrical emergency situations. [24,25,26,27] Therefore, using simulation in nursing education and training is a recommended strategy which useful for better prepare the nursing students for providing the necessary skills for the maternal and child through training them about the postpartum procedures as breast care and breast feeding, perineal care, growth measurement and daily care of new born in a safe, realistic and risk -free learning environment.

## 2. Aim of Study

Assess the effect of using simulation on the performance of nursing students toward postpartum period.

### 2.1. Research Hypothesis

Using clinical simulation will enhance the performance of nursing students toward postpartum period.

## 3. Material and Methods

### 3.1. Study Design

A nonequivalent control group pretest-posttest, quasi experimental design was utilized.

### 3.2. Study Setting

This study conducted at nursing skill lab of the Technical Health Institute affiliated to Minister of Health and Population in Mansoura City, Egypt.

### 3.3. Participants

The study participants were composed of all students (130) who were studying the maternity and child nursing course in the first year of general nursing department at Technical Health Institute in academic year 2017-2018.

### 3.4. Sampling

A convenient sampling technique utilized to recruited participants in this study. The total number of students was 130 female students. Taking into account the ethical consideration, the students divided into; 100 students participate in the study as an experimental group who were studying with simulation teaching method in the second semester. And the rest of 30 students refused to participate in the study. The researcher includes them as a control group who were studying with the traditional method (face-to-face lecture).

### 3.5. Tools

Data was collected by using the following five tools that were developed by the researcher after reviewing relevant literature except the first tool that adopted from El-Gilany, El-Wehady and El-Wasify, [29] and Ahmed and Mohamed. [30]

Tool I: Self-administered questionnaire to assess students' socio-demographic, economic and academic

characteristics: this questionnaire was divided into two parts:

1.1. The first part was adopted from El-Gilany, El-Wehady and El-Wasify, [29] which used to assess students' socio-demographic and economic characteristics including age, marital status, residence and the family monthly income.

1.2. The second part was adopted from Ahmed and Mohamed, [30] which concerned with the students' academic characteristics as the previous studying of the postpartum period, the place and duration of the study.

Tool II: A simulation-learning modules: This part developed by the researcher about using modules of the postpartum period procedures as breast care and breast-feeding, perineal care, growth measurement and newborn daily care.

Tool III: Self-administrated questionnaire to assess students' knowledge regarding the postpartum period: this questionnaire developed by the researcher and consisted of 15 multiple-choice questions to determine the level of students' knowledge toward the postpartum period. It included: definition of the postpartum period, normal physiological changes, psychological problems, women and newborns needs, possible complications, importance of breast-feeding for women and newborns, possible care provided and main causes of maternal and neonatal death. This tool used in pre- test, immediate and follow up post test (after two to three months).

**Scoring system**

The total scores of this tool ranged from zero to 30 marks; the correct and complete answer scored = 2 marks, the correct and incomplete answer scored = 1 mark and do not know answer = 0 mark. The knowledge level was categorized into three categories: poor = scores less than 50 % of total scores (less than 15 degree), average = scores 50 % to 65 % of total scores (from 15 to 19.5 degree), good = scores more than 65% of total scores (more than 19.5 degree).

Tool IV: Observation checklist to assess students' performance: these checklists consisted of steps that evaluated the student's performance regarding to the postpartum period. This tool used in pre- test, immediate and follow up posttest (after two to three months).

**Scoring system**

The total scores of this tool ranged from zero to 155 marks that distributed as; the proper step scored= 1 mark and the improper step scored= 0. These categories classified as the following: breast care check list (included 22 steps = 22 marks), breast feeding checklist (included 18 steps = 18 marks), perineal care checklist (included 25 steps = 25 marks), Growth measurement checklist (included 35 steps = 35 marks) and daily nursing care of newborn checklist (included 55 steps = 55 marks). The total scoring system of performance: categorized into two categories: improper = scores less than 60 % of total scores (less than 93 marks) and proper = scores more than 60% of total scores (more than 93 marks).

Tool V: Students' perception scale: this scale used to assess the experimental group students' perception related to using simulation in teaching the modules of postpartum period**.** This scale consisted of 53 statements that expressed the student's opinions regarding to simulation module, content, module interactivity, environment, instructors and the obstacles of simulation learning module. The responses of this scale were requiring four responses of the Liker- rating scale. Total scores of this scale 212 points; strongly agree scored =4, agree scored =3, disagree scored = 2 and strongly disagree scored =1.

## 3.6. Methods

### 3.6.1. Preparatory Phase

**1. Administrative process**

• An official permission obtained from Faculty of Nursing, Mansoura University to the manager of the Technical Health Institute affiliated to Minister of Health and Population in Mansoura to permit for the researcher carry out of the study.

• The researcher was set the time for beginning the course, explained the process of the study for other staff members and asked them to support and cooperate during data collection.

• The researcher arranged the clinical rotation schedule of the students with other staff members.

**Ethical considerations**

• Ethical approval obtained from Research Ethics Committee of Faculty of Nursing, Mansoura University.

• The students' verbal approval taken before beginning of the course. In addition, the student had the right to withdraw from the study at any time.

• All students informed that the collected data used only for the purpose of the study and the scores not affected on their progress.

**2. Literature Review**

A review of the international and national literature were carried out on a various points of the postpartum period, the new teaching and learning methods, the published scientific articles, the textbook and the internet search. This review helped in developing the study tools.

**3. Developing the study tools:**

• Tools of data collection developed by the researcher after reviewing the related literature except tool I (part 1and 2).

• The validity of the study tools tested by a jury that involves five experts in the field of community health nursing and biostatistician expertise and their required modification had been done.

• Reliability of these tools carried out on a ten students who were showing the following results: the Cronbach's alpha of the knowledge questionnaire = 0.85, the Cronbach's alpha of the performance checklists= 0.93 and the Cronbach's alpha of the attitude scale= 0.94.

**4. Pilot study:**

A pilot study was included 10% of study sample (13 students) who were the students in the second year in the general modules in the postpartum period to test the clarity and applicability of the study tools, detect the obstacles of the simulation module and determine the exact time that needed for data collection. Accordingly, any required modification done.

### 3.6.2. Operational Phase

**Data collection**

- The duration of preparation approximately six months from April to October/ 2017.

- The duration of data collection was approximately four months from February to May /2018.
- At first, the researcher introduced herself to all students; then she explained the aim, design and the study process.
- At the beginning of the study, the researcher was assessed the students' knowledge toward the postpartum period through the pre- knowledge test which used the self- administrated questionnaire for all students in the control and experimental groups. This test lasts 30 minutes, and then she had been collected the questionnaire from the students after the time turned off.

### 3.6.3. Implementation Phase

**1. Simulation learning module was consisted of two sections:**

**Knowledge section:** consisted of knowledge related to the postpartum period which includes: define the postpartum period, discuss the normal physiological changes, recognize the most common psychological problems, differentiate the women and infants' needs, illustrate the possible complications, identify the importance of breast-feeding for both women and newborns, explain the provided care and determine the main causes of maternal and neonatal death.

This part presented by using group discussion, power point presentation and data show in the lectures hall of the Technical Health Institute affiliated to Minister of Health and Population in Mansoura.

**Performance section:** consisted of the procedures of the postpartum care which includes: breast care, breast-feeding procedure, the perineal care, growth measurement procedure and the daily care of newborn.

Those procedures explained through demonstration and re-demonstration by using simulation model and video based learning at the nursing skill lab of the Technical Health Institute affiliated to Minister of Health and Population in Mansoura.

**Students divided into two groups:**

- **Control group:** the total number of students in the control group was 30 students. The traditional teaching method (face-to-face lecture) used for those students.
- **Experimental group:** the total number of the students in the experimental group was 100 students. They divided into 6 groups, each group ranged from 16 – 17 students. Simulation module used for those students in the second semester. The curriculum divided into 7 sessions. The time of each session varied from 60 to 180 minutes within three days/ week.

- The researcher started with the introductory session and the pre- test in the first session for all six groups of students. Then the second session was the postpartum period knowledge that presented by the group discussion and data show for all groups of students, and the immediate post knowledge test had done at the same session.
- The postpartum procedures divided into 5 sessions, which conducted at the nursing skill lab. Each session explained for two groups of the students per day within one week for each procedure. The researcher was started with explanation of all procedure steps on the model then showed the video for each group as these learning methods could allowed the students to see, hear and interact with the researcher during the learning process. The immediate- performance test for each group done in every session.

### 3.6.4. Evaluation Phase

Evaluation done in pre- test, immediate and follow up post test to assess students' knowledge, performance and perception regarding postpartum period as: determine the effect of using the traditional learning method for the students in the control group and simulation learning method for the students in the experimental group, evaluate all students' knowledge toward the postpartum period through using the study tool III and evaluate their performance through using the study tool IV and detect the students' perception toward using the simulation learning module through using the study tool V for the experimental group only.

**Data analysis**

Data coded, categorized, organized and transferred into a specially designed format to be suitable for computer feeding, then analyzed using SPSS (Statistical Package Service Solutions) version 22.0. The qualitative data presented by using the descriptive analytical statistics as numbers and percentages. The relations were done by using Chi- Square test for discrete variables. The quantitative data tested for normality by Kolmogrov-Smirnov test. Normally distributed data presented by mean ±SD. The proportion probability (P value) used to detect the significance as the following: P value < 0.05 considered significant differences; P value < 0.001 considered highly significant differences and P value > 0.05 considered not significant differences.

**Difficulties of the study:**

The difficulties that facing this study included:

- Preparation of model consumed long time and effort.
- Difficulty imitated the physiological signs and symptoms.
- Difficulty detected the psychological effect of the illness.
- Arrangement of the clinical rotation schedule consumed time and effort.
- Simulation models needed many facilities and highly costs.

## 4. Results

The collected data of the current study showed the following results:

Table 1 illustrates the socio-demographic characteristic of studied sample. Finding of students' marital status showed that 70.0% and 80.0% of them in both control and experimental groups were single respectively. Regards to residence, there was 70.0% of the students in the control group belonged to rural areas compared to 87.0% in the experimental group.

Table 2 illustrates the control and experimental group students' total score level of knowledge about the postpartum period in pre, immediate and follow up posttest. It showed that 83.3% and 92.0% of students in both control and experimental groups had poor total score level of knowledge in the pretest. As for immediate test, 43.3% of the students in the control group had average

total score level of knowledge, while 85.0% of the students in the experimental group had good total score level of knowledge. There was statistically significant difference (p = 0.00). Finally, 40.0 % of students in control group had average total score level of knowledge in the follow up posttest compared to 82.0% of students in the experimental group had good total score level of knowledge. There was statistically significant difference (p = 0.00).

Table 3 illustrates the control and experimental group students' total score level of performance regarding to the postpartum period in pre, immediate and follow up posttest. It showed that all students in both control and experimental groups had improper total score level of performance in the pretest. As for immediate test, 76.7% and 95.0% of the students in both control and experimental groups had proper total score level of performance respectively. There was statistically significant difference (p = 0.02). Finally, 66.7 % of students in control group had proper total score level of performance in the follow up posttest compared to 93.0% of students in the experimental group. There was statistically significant difference (p = 0.00).

Table 4 illustrates the experimental group students' perception regarding to simulation. In this table, 63.0%, 62.0%, 61.0% of the experimental group students were strongly agreed that simulation improving knowledge, grasping the attention and was flexible respectively. Also, 57.0% of them were strongly agreed that simulation was interactive, effective and increasing motivation.

Table 5 illustrates the experimental group students' perception regarding to the course content.

It mentioned that 62.0%, 58.0% and 57.0% of the experimental group students displayed strongly agree about simulation exercises were enjoyable for the students, beneficial for the practical skills and enhancing the knowledge base respectively. Moreover, 52.0% of them were strongly agree about simulation content is reliable, and providing a clear explanation of the education content.

Table 6 illustrates the experimental group students' perception regarding to the course interactivity. This table demonstrates that 59.0% of the students in the experimental group displayed strongly agree about the simulation module was suitable for their level. Also, 50.0% said suitable for their abilities and they have the opportunity to interact with the module.

In addition to, 49.0% , 46.0% and 44.0% of the experimental group stated strongly agree in relation to they have the chance for excited learning, the opportunity to discover the information by themselves and they have the chance to apply the learnt information rather than memorized it.

Table 7 illustrates the experimental group students' perception regarding to the course environment. This table illustrates that 78.0% and 70.0% of the students in the experimental group displayed strongly agree about simulation is providing a variety of learning materials and learning activities to promote the learning process respectively. Also, 72.0% of them displayed strongly agree about the simulation was used as teaching materials which motivated the students to learn. Regarding to using video in the learning process, 80.0% of the students displayed strongly agree about using video was enhancing the presentation of information. In addition, 75.0%, 80.0% and 82.0% of the students displayed strongly agree about the quality of video, light and sound was good respectively. Finally, 86.0% and 74.0% of the students displayed strongly agree about the font size and style was proper and suitable for them respectively.

Table 8 illustrates control and experimental group students' total score of knowledge and performance in the pre, immediate and follow up posttest: It demonstrates that the mean of total score of knowledge of the control group was increased from 13.50 (2.35) in the pretest to 19.47 (5.10) in the immediate test, but it was declined to 17.50 (4.58) in the follow up posttest. While, in the experimental group mean of total score of knowledge was increased from 11.78 (1.07) in the pretest to 23.74 (4.43) in the immediate test, but it was declined to 22.47 (3.60) in the follow up posttest. There was statistical significant difference (p = 0.000). Regarding to the mean of total score of performance; in the control group, it was elevated from 66.03 (4.28) in the pretest into 106.80 (13.18) in the immediate test, but it was decreased to 95.37 (14.62) in the follow up posttest. In the experimental group, it was increased from 65.34 (5.09) in the pretest into 123.15 (8.88) in the immediate test, but it was declined to 122.78 (10.09) in the follow up posttest. There was statistical significant difference (p = 0.000). Concerning to the improvement of effect of the simulation teaching method, the experimental group was higher than the control group in both total knowledge score (90.75%) and total performance score (87.91%).

**Table 1. Socio-demographic and academic characteristics of control and experimental group students'**

| Items | Control Group (N= 30) | | Experimental Group (N= 100) | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Age | | | | |
| Mean (SD) | 1.17 (0.38) | | 1.27 (0.45) | |
| Marital status | | | | |
| Single | 21 | 70.0 | 80 | 80.0 |
| Married | 9 | 30.0 | 20 | 20.0 |
| Residence | | | | |
| Rural | 21 | 70.0 | 87 | 87.0 |
| Urban | 9 | 30.0 | 13 | 13.0 |
| Studying the postpartum period before | | | | |
| Place of studying (nursing school) | 30 | 100.0 | 100 | 100.0 |
| Duration of studying (6months / year) | 30 | 100.0 | 100 | 100.0 |

**Table 2. Total score level of knowledge of control and experimental group students' regarding the postpartum period in pre, immediate and follow up posttest**

| Postpartum knowledge | Control group N= 30 | | Experimental group N= 100 | | $X^2$ | P |
|---|---|---|---|---|---|---|
| | N | % | N | % | | |
| **Pre- test** | | | | | | |
| Poor | 25 | 83.3 | 92 | 92.0 | 1.926 | .165 |
| Average | 5 | 16.7 | 8 | 8.0 | | |
| Good | 0 | 0.0 | 0 | 0.0 | | |
| **Immediate test** | | | | | | |
| Poor | 6 | 20.0 | 4 | 4.0 | 36.317 | .000 |
| Average | 13 | 43.3 | 11 | 11.0 | | |
| Good | 11 | 36.7 | 85 | 85.0 | | |
| **Follow up posttest** | | | | | | |
| Poor | 10 | 33.3 | 5 | 5.0 | 36.317 | .000 |
| Average | 12 | 40.0 | 13 | 13.0 | | |
| Good | 8 | 26.7 | 82 | 82.0 | | |

**$X^2$:** chi- square test, **P**: significance (P < 0.005).

**Table 3. Total score level of performance of. control and experimental group students' regarding the postpartum period in pre, immediate and follow up post test**

| Postpartum performance | Control group N= 30 | | Experimental group N= 100 | | $X^2$ | P |
|---|---|---|---|---|---|---|
| | N | % | N | % | | |
| **Pre- test** | | | | | | |
| Improper | 30 | 100.0 | 100 | 100.0 | 1.631 | .351 |
| Proper | 0 | 0.0 | 0 | 0.0 | | |
| **Immediate test** | | | | | | |
| Improper | 7 | 23.3 | 5 | 5.0 | 9.257 | .002 |
| Proper | 23 | 76.7 | 95 | 95.0 | | |
| **Follow up post test** | | | | | | |
| Improper | 10 | 33.3 | 7 | 7.0 | 14.078 | .000 |
| Proper | 20 | 66.7 | 93 | 93.0 | | |

**$X^2$:** chi- square test, **P:** significance (P < 0.005).

**Table 4. Perception of experimental group students' regarding the simulation leaning module**

| Simulation learning module | Strongly disagree | | Disagree | | Agree | | Strongly agree | |
|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % |
| Simulation was flexible | 1 | 1.0 | 2 | 2.0 | 36 | 36.0 | 61 | 61.0 |
| Simulation was interactive | 1 | 1.0 | 3 | 3.0 | 39 | 39.0 | 57 | 57.0 |
| Simulation was interesting | 1 | 1.0 | 2 | 2.0 | 40 | 40.0 | 57 | 57.0 |
| Simulation was increasing motivation | 1 | 1.0 | 4 | 4.0 | 46 | 46.0 | 49 | 49.0 |
| Simulation was effective | 1 | 1.0 | 4 | 4.0 | 38 | 38.0 | 57 | 57.0 |
| Simulation was grasping the attention | 1 | 1.0 | 2 | 2.0 | 35 | 35.0 | 62 | 62.0 |
| Simulation was improving knowledge | 1 | 1.0 | 2 | 2.0 | 34 | 34.0 | 63 | 63.0 |

**Table 5. Perception of the experimental group students' regarding the course content**

| Course content items | Strongly disagree | | Disagree | | Agree | | Strongly agree | |
|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % |
| Simulation providing a clear explanation of the education content | 3 | 3.0 | 4 | 4.0 | 41 | 41.0 | 52 | 52.0 |
| Simulation exercises beneficial for the practical skills | 2 | 2.0 | 3 | 3.0 | 37 | 37.0 | 58 | 58.0 |
| Simulation content providing the opportunity to improve the learning process | 1 | 1.0 | 5 | 5.0 | 50 | 50.0 | 44 | 44.0 |
| Simulation content is reliable | 2 | 2.0 | 5 | 5.0 | 41 | 41.0 | 52 | 52.0 |
| Simulation content structured in a clear manner | 3 | 3.0 | 3 | 3.0 | 43 | 43.0 | 51 | 51.0 |
| Enjoyable simulation exercises for the students | 2 | 2.0 | 2 | 2.0 | 34 | 34.0 | 62 | 62.0 |
| Simulation exercises preparing the students for the clinical rotations | 2 | 2.0 | 2 | 2.0 | 49 | 49.0 | 47 | 47.0 |
| Simulation exercises enhancing the knowledge base | 3 | 3.0 | 6 | 6.0 | 34 | 34.0 | 57 | 57.0 |

**Table 6. Perception of the experimental group students' regarding the course interactivity**

| Course interactivity items | Strongly disagree | | Disagree | | Agree | | Strongly agree | |
|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % |
| Suitable for students' level | 1 | 1.0 | 4 | 4.0 | 36 | 36.0 | 59 | 59.0 |
| Suitable for students' abilities | 1 | 1.0 | 3 | 3.0 | 46 | 46.0 | 50 | 50.0 |
| Students have the opportunity to interact with the program | 1 | 1.0 | 5 | 5.0 | 44 | 44.0 | 50 | 50.0 |
| Students have the opportunity to discover the information by themselves | 4 | 4.0 | 2 | 2.0 | 48 | 48.0 | 46 | 46.0 |
| Students have the chance to apply the learnt information rather than memorized it | 1 | 1.0 | 5 | 5.0 | 50 | 50.0 | 44 | 44.0 |
| Students have the chance for excited learning | 2 | 2.0 | 2 | 2.0 | 47 | 47.0 | 49 | 49.0 |

**Table 7. Perception of the experimental group students' regarding the course environment**

| Course environment items | Strongly disagree | | Disagree | | Agree | | Strongly agree | |
|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % |
| Simulation is providing variety of learning materials | 2 | 2.0 | 2 | 2.0 | 18 | 18.0 | 78 | 78.0 |
| Simulation is providing variety of learning activities to promote the learning process | 4 | 4.0 | 2 | 2.0 | 24 | 24.0 | 70 | 70.0 |
| Simulation is using a teaching materials which motivated the students to learn | 1 | 1.0 | 2 | 2.0 | 25 | 25.0 | 72 | 72.0 |
| Using the video learning is enhancing the presentation of the information | 2 | 2.0 | 4 | 4.0 | 14 | 14.0 | 80 | 80.0 |
| Quality of the video is good | 1 | 1.0 | 2 | 2.0 | 22 | 22.0 | 75 | 75.0 |
| Quality of the light is good | 1 | 1.0 | 1 | 1.0 | 18 | 18.0 | 80 | 80.0 |
| Quality of the sound is good | 2 | 2.0 | 2 | 2.0 | 14 | 14.0 | 82 | 82.0 |
| Using a proper fonts size | 2 | 2.0 | 2 | 2.0 | 10 | 10.0 | 86 | 86.0 |
| Using a proper fonts style | 1 | 1.0 | 2 | 2.0 | 23 | 23.0 | 74 | 74.0 |

**Table 8. Total score of knowledge and performance of control and experimental group students' in the pre, immediate and follow up posttest**

| Items | Control group N=30 | | | Experimental group N=100 | | | T | P value |
|---|---|---|---|---|---|---|---|---|
| | Mean | S.D | % of Change | Mean | S.D | % of change | | |
| **Total knowledge score** | | | | | | | | |
| **Pre test** | 13.50 | 2.35 | | 11.78 | 1.07 | | | |
| Immediate test | 19.47 | 5.10 | 29.63 % | 23.74 | 4.43 | 90.75% | - 10.511 | 0.000 |
| Follow up test | 17.50 | 4.58 | | 22.47 | 3.60 | | | |
| **Total performance score** | | | | | | | | |
| Pre test | 66.03 | 4.28 | | 65.34 | 5.09 | | | |
| Immediate test | 106.80 | 13.18 | 44.43 % | 123.15 | 8.88 | 87.91 % | -9.028 | 0.000 |
| Follow up test | 95.37 | 14.62 | | 122.78 | 10.09 | | | |

# 5. Discussion

Simulation is an educational strategy which designed to imitate the clinical environment and provides the opportunity for the student to demonstrate knowledge and skills learned within their education program in a realistic and safe environment. Also, it enhanced their performance, decreased the error rates and improved the patient care and safety through giving the sufficient time to refine and improve their motor skills. [31,32,33,34]

According to the socio-demographic characteristics of the studied students, this study demonstrated that the mean age of the students in the control and experimental groups were 1.17 (0.38) years and 1.27(0.45) years respectively. In addition to, the present study mentioned that although less than three quarters of studied students in control group were single and live in rural areas, but the majority of the students in the experimental group were single and live in rural areas.

This result was in agreement with the studies of Ahmed and Mohamed, (2016), [30] which conducted at faculty of nursing, Ain Shams University and included 200 students and Said, (2017), [35] which conducted at the College of Nursing in Saudi Arabia and included 158 students. They reported that the majority of the students were single. But, this result was in disagreement with the study of Ahmed and Mohamed, (2016), [30] who stated that more than half of the students were live in urban areas.

Regarding to the students' total score level of knowledge in the pre, immediate and follow up posttest, this study mentioned that the majority of the students in the control group and most of the students in the experimental groups had poor total score level of knowledge regarding the postpartum period in the pretest with no statistically significant difference between both of them.

This result was confirmed with the studies of Durmaz, et al (2012), [36] which done in Turkey and composed of 82 students; Sheha, et al, (2015), [33] which done in Mansoura and Fayoum universities and included 331 students and Zaky, (2017), [37] which done in Alexandria university and included 100 nursing students.

They reported that most of students in the control and experimental groups had similar poor score level of knowledge and there was no statistically significant difference in the pretest score between the students in the control and experimental groups. This result may be due to the majority of the students haven't a sufficient knowledge about the postpartum period. In addition to they may forget the basic knowledge about this period.

This study observed that although there was a general improvement in students' knowledge for both control and experimental groups in the immediate and follow up posttest as compared to the pretest and there was a slight decline occurred during follow up test relative to immediate test, the majority of students in the experimental group had higher total scores of knowledge than the control group in the immediate and follows up posttest. There was a statistically significant difference observed between both control and experimental groups.

This result was supported with the studies of Kamel, et al. (2010), [38] which done in Benha University and included 98 students; Ameh, et al. (2012), [39] which done in Somalia and included 222 healthcare providers and Kumar, et al. (2016), [40] which done in Northern India and included 20 postgraduate students. They observed that there was a general improvement in knowledge for both control and study groups as compared to the pre- phase. Although a slightly decline occurred during follow-up phase relative to the immediate phase, but the study group had higher scores than the control group. The difference observed between the two groups was statistically significant.

Concerning to the students' total score level of performance through pretest, immediate and follow up posttest, this study showed that all students in both control and experimental groups had improper total score level of performance regarding the postpartum period in the pretest, but most of the students in the experimental group had a proper total score level of performance compared to more than three quarters of the students in the control group in the immediate posttest.

Also, most of the students in the experimental group had a proper total score level of performance compared to two third of the students in the control group in the follow up posttest. There was a significant improvement of the students' performance in the post test intervention. This finding came in agreement with the studies of Sheha, et al. (2015), [33] the study of Zaky, (2017), [37] and Abd Elhakm and Elbana, (2018), [41] which done in Benha University and included 65 nurses. They reported that after simulation training program there was higher scores with significant improvement in the study group throughout the three months since the beginning of the simulation training compared to the control group.

The result of this study explained that there was a general improvement in students' performance for both control and experimental groups as compared to the pretest. Although there was a slight decline occurred during follow up posttest relative to the immediate test, but the majority of students in the experimental group remained had higher total score level of performance compared to the control group in the immediate and follows up posttest. There was a statistically significant difference observed between both control and experimental groups.

This point of view was in agreement with the studies of Kamel, et al. (2010), [38] and Sheha, et al. (2015). [33] They illustrated that there was a general improvement in the performance of both control and study groups as compared to pre phase. However, a slightly decline observed in the follow-up phase in relation to the immediate phase, but the study group still better than the control group with a highly significant statistical difference between the control and the study group. This result may be due to using the simulation module was effective and efficient than the traditional methods. Also, it can grasping student's attention and providing the chance to discover information rather than memorized it.

Experimental group students' perception regarding to the simulation module, this study showed that most students displayed strongly agree or agree about the simulation was flexible, interactive and more interesting than traditional methods. This result was in agreement with the study of Sheha, et al. (2015), [33] who reported that the majority of the students showed agree about simulation learning was flexible, interactive and interested.

In this study, most students displayed strongly agree or agree about the simulation was motivated to learn more than the traditional methods. This result was in agreement with the studies of Karadag, (2012), [42] which done in Gazi University, Turkey and included 82 students and Sheha, et al. (2015). [33] They reported that the majority of the students displayed strongly agree or agree about simulation increasing motivation.

Most students displayed strongly agree or agree about the simulation was effective more than the traditional methods. This was in agreement with the studies of Ma, (2013), [43] which done in Cedarville University, Ohio and included 50 students; Marzouk, (2015), [26] which done in Mansoura university and included 92 students and Omer, (2016), [44] which done in the College of Nursing- Jeddah, Saudi Arabia and included 117 students. They reported that the majority of the students displayed strongly agree or agree about simulation was effective.

The result of this study showed that most students displayed strongly agree or agree about simulation exercise was enjoyable, beneficial for the practical skills and enhancing the knowledge. This point of view was in the same line with the study of McGowan, et al. (2011). [45]

Also, the majority of the students displayed strongly agree or agree about simulation content was reliable with up-dating curriculum and the vocabulary relevant to the students' abilities. This result was supported by the study of Sheha, et al. (2015). [33] They mentioned that the majority of the students displayed agree about simulation content was reliable. Its' concept was relevant to the learner ability and the information was up to date.

Most students displayed strongly agree or agree about simulation was suitable for the students level. Also, it was provided the students' chance to discover the information and apply the learnt information rather than memorized it. It was in agreement with the study of Sheha, Soliman & Abd El Mouty, (2015). [33]

In this study, most students displayed a strongly agree or agree about the simulation was provided a variety of learning materials and activities which motivated the students to learn. This result was supported by finding of other studies. [26,43,44] As well as, most students displayed a strongly agree or agree about the quality of the video, light and sound was good. Also, there was a proper font size and style. Similar was found by other study. [33]

At the end of this study; after using simulation learning module, there was a general improvement of the students' knowledge and performance regarding the postpartum period in both control and experimental group. However, the experimental group was higher than the control group. This result was in agreement with the study of Sheha, et al. (2015). [33] She reported that the simulation learning module proved to be effective for students to gain and improve the actual knowledge and skills. There was a general improvement in both control and experimental group. The experimental group was higher than the control group.

## 6. Conclusion:

Based on the finding of the present study, it is concluded that although, the total score levels of knowledge and performance of the students in the control and experimental groups was increased in the immediate test, but it was declined in the follow up post test. It was still higher in the experimental group than the control group.

Concerning to the effect of simulation leaning module on the students in control and experimental groups, the experimental group was higher than the control group in both total score of knowledge and total score of performance.

## 7. Recommendations

Based on the finding of the present study: it was recommended the following: Introducing the simulation -based learning in all nursing curriculum at all fields, expanding using of simulation learning module in educating the students to bridge the gap between knowledge and clinical practice and encouraging the researchers in the future to explore the effect of using simulation training program on the students' performance regarding to the rarely and critically situations.

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