

Effect of High Fidelity Simulation on Intern Students' Competency regarding Clinical Guidelines for Active Management of the Third Stage of Labor

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Abstract

Background: The third stage of labor is a critical period, thus using high fidelity simulation to enhance intern students' competency through implementing the clinical guidelines for active management of the third stage of labor is essential for preventing its serious complications mainly postpartum hemorrhage. **The aim of this study:** Was to determine the effect of high fidelity simulation on intern students' competency regarding clinical guidelines for active management of the third stage of labor. **Subjects and Method:** The study was carried out at Objective Structure Clinical Examination (OSCE) skills laboratory at Faculty of Nursing, Tanta University. A convenient sample consists of 50 intern nursing students who were trained at labor unit, obstetric department, Tanta university hospital and fulfilling the inclusive criteria. **Three tools** were used to collect the data: **Tool (I): A structured interview schedule** included three parts: **Part (a)** Socio demographic characteristics of the intern nursing students, **part (b)** Intern students' knowledge regarding the third stage of labor, and **part (c)** Intern students' knowledge regarding clinical guidelines for active management of the third stage of labor. **Tool (II): Intern students' practice observational checklist** contained seven sequential steps of clinical guidelines for active management of the third stage of labor. **Tool (III): Modified Self-Confidence Measurement Scale** included 7 items that measured how confident intern nursing students felt about the skills they performed during simulation training program. **Conclusion:** Based on the findings of the present study, it can be concluded that high fidelity simulation training significantly improved the intern students' knowledge, practice as well as the self-confidence regarding clinical guidelines for active management of the third stage of labor. **Therefore, the study recommended** that providing pre-service and in-service training programs using high fidelity simulation especially for newly appointed intern nurses is crucial to improve their knowledge and practices as well as the self-confidence.

Keywords: High Fidelity Simulation, Competency, Clinical Guidelines, Active Management of Third Stage of Labor.

Introduction

Third stage of labor is the period between delivery of the newborn and delivery of the placenta and membranes. It is the shortest stage that lasting between 15 to 20 minutes and has three phases which are; uterine contractions, placental separation and expulsion. It is the most dangerous and risky period as if the uterus not contracts well and the placenta fails to separate within 30 minutes after childbirth, profuse postpartum hemorrhage will occur^(1,2). Postpartum hemorrhage is an obstetric emergency, life threatening condition and the main direct cause of maternal morbidity and mortality. It complicates more than 10 % of all births and responsible for 27.1% of all maternal deaths all over the world in 2020⁽³⁾. In Egypt (2021), an estimated of 20 % of maternal deaths were related to postpartum hemorrhage⁽⁴⁾.

Understanding the nature and physiological changes of the third stage of labor as well as applying the clinical guidelines for active management of the third stage of labor are essential for preventing the serious complications especially postpartum hemorrhage⁽⁵⁾. This accommodate with the recommendations of World Health Organization (WHO), National Institute for Health and Care Excellence (NICE), the International Federation of Gynecologists and Obstetricians (FIGO) and the International Confederation of Midwives (ICM)⁽⁶⁻⁸⁾.

The clinical guidelines for active management of the third stage of labor are feasible and inexpensive interventions that can help to save millions of women's lives especially in developing countries. High quality evidence based practice

reported that 10% of all maternal deaths were prevented with timely, effective and full use of clinical guidelines for active management of third stage of labor. This reduces the incidence of postpartum hemorrhage, the need for blood transfusion, and the use of therapeutic utero tonics during the third stage of labor, improving women's health and reducing maternal mortality that is central to the 2030 agenda for sustainable development strategy^(9,10).

The clinical guidelines are prophylactic interventions composed of a package of the three main components of active management of the third stage of labor. These include administration of a utero-tonic drug (10 international unit intramuscularly of oxytocin is the drug of choice) within 1 minute after birth of newborn, and ruling out the presence of another fetus. Then, clamping and cutting the cord after cessation of its pulsation or approximately from 2-3 minutes after birth of the newborn. This is followed by applying controlled cord traction (CCT) for placental delivery^(6,11).

These previous steps are implemented alongside with the provision of immediate neonatal assessment of breathing, performing resuscitation if needed and applying maternal–fetal skin-to-skin contact. Following delivery of the placenta and membranes, uterine massage is applied immediately and every 15 minutes for 2 hours until it becomes firm. Finally, the genitalia should be inspected carefully and the amount of blood loss should be estimated^(8,12).

Maternity nurses are the frontlines health care providers who are responsible for improving women's health and saving their lives⁽¹³⁾. Nowadays, improving the competency of different nursing categories is an urgent need especially for the nursing interns as they have the theoretical knowledge, but finding difficulty to transfer and correlate that knowledge into practice. Additionally, they become stressful, fearful, and straggle when facing real patient in clinical setting if they were not well prepared^(14,15).

Nursing competency is the ability to perform a task with desirable outcomes. It is the ability of the students to integrate their skills and knowledge into the clinical practice. This

competency can grow through integrating their knowledge, skills, personal experience, critical thinking and judgment in order to practice effectively^(16,17). Therefore, the trainers should follow innovative education techniques to strengthen the intern students' practical and communication skills before the onset of their clinical engagement. One of the main methods that should be used for improving the competency in nursing practical training is clinical simulation⁽¹⁸⁾.

Simulation training is a participant-centered alternative to the traditional teaching methods, which are critical to optimize patient safety and quality. It refers to the activities that mimic the real clinical environment by emerging the nursing procedures, decision making and critical thinking through techniques such as role playing, interactive videos or mannequins⁽¹⁹⁾. Simulation training can fill the gap between theory and practice. Subsequently, provides an opportunity for the nursing intern students to improve their cognitive, psychomotor, problem-solving, communication and management skills as well as increases their self-confidence while dealing with emergency situations⁽²⁰⁾.

Simulation can be used at different levels and models (low, moderate and high). High-fidelity simulations are highly technical, life like human mannequins that breath, talk, have heart and lung sounds and are used to replicate evidence based clinical scenarios for training purposes. Previous research studies concluded that using high fidelity simulation is very effective in improving nursing students' learning outcomes. On the other hand literatures didn't focus on the effectiveness of using high fidelity simulation of reactive labor which is associated with emergency and life threatening situations to reduce maternal morbidity and mortality rate⁽²¹⁻²³⁾. Thus, it is very important to determine the effect of high fidelity simulation on intern students' competency regarding clinical guidelines for active management of the third stage of labor.

Aim of the study

The aim of this study was to determine the effect of high fidelity simulation on intern students'

competency regarding clinical guidelines for active management of the third stage of labor.

Operational definition: Nursing competency in this study refers to knowledge, practice and self-confidence of intern nursing students.

Subjects and Method

Research design

A quasi experimental study design was utilized in this study.

Setting

The study was conducted at the Objective Structure Clinical Examination (OSCE) skills laboratory of Faculty of Nursing, Tanta University for training of intern nursing students on clinical guidelines for active management of the third stage of labor by using high fidelity birthing simulator (Sim Mom).

Subjects

A convenient sample consisted of 50 intern nursing students who were trained at labor unit, obstetric department, Tanta university hospital over a period from the beginning of April to the end of September 2021. The studied intern nursing students were selected from the previously mentioned setting according to the following inclusion criteria:

- Male or female students.
- Willing to participate in the study.

Tools of data collection

To achieve the aim of the study three tools were used.

Tool (I): A structured interview schedule was developed by the researchers after review of relevant recent literatures to collect basic data about the study subjects⁽¹²⁻¹⁶⁾. It consisted of three main parts as follows:-

Part a

Socio demographic characteristics of the intern nursing students: included; age, sex, residence and telephone number.

Part b

Intern students' knowledge regarding the third stage of labor: It was developed by the researchers to assess students' knowledge regarding the third stage of labor including: definition and duration of the third stage of labor,

signs of placental separation, mechanisms of placental delivery, importance of placental examination and complications of the third stage of labor.

Part c

Intern students' knowledge regarding clinical guidelines for active management of the third stage of labor: It was developed by the researchers and included students' knowledge regarding the clinical guidelines for active management of the third stage of labor such as: definition, importance and steps.

Knowledge total scoring system was categorized as follows: correct and complete answers were scored as (2), correct and incomplete answers were scored as (1) and incorrect answers or don't know were scored as zero (0).

The total score for knowledge was calculated as follows: high level of knowledge: 75-100%, moderate level of knowledge: 50- to less than 75% and low level of knowledge: less than 50%.

Tool (II): Intern students' practice observational checklist: This tool was adapted by the researchers guided by **Global Library of Women's Medicine**⁽²⁴⁾. The practice observational checklist contained sequential steps of clinical guidelines for the active management of third stage of labor as follow: **step (1):** neonatal assessment, **step (2):** administration of a uterotonic drug, **step (3):** umbilical cord clamping and cutting, **step (4):** controlled cord traction, **step (5):** placental examination, **step (6):** uterine massage, **step (7):** inspection of genitalia and blood loss estimation.

The observational checklist total scoring system was categorized as follows: correctly and completely done was scored as (3), correctly and incompletely done was scored as (2) and incorrect or not done was scored as (1).

The total score of practice was calculated as follows: satisfactory: 60 - 100% and unsatisfactory: less than 60%.

Tool (III): Modified Self-Confidence Measurement Scale: it was adopted from **Abd-Elhakm E. and El-Bana H. (2018)**⁽²⁵⁾. It included 7 items that measured how confident intern nursing students felt about their skills during

simulation training program. These items were measured on a three-point Likert scale as follows: (2) for agree, (1) for disagree and (0) for strongly disagree. The total score was interpreted as (0 to 7) un-confidant and (8 to 21) confidant.

Methods

Approval

- An official permission from the dean of faculty of nursing to use the Objective Structure Clinical Examination (OSCE) skills laboratory of the faculty in training of the intern nursing students. Additionally, an official letter clarifying the purpose of the study was obtained from the Faculty of Nursing and submitted to the directors of the selected setting.

Development of the tools

-**Tool I** was developed by the researchers after the extensive review of the relevant and recent literatures⁽¹²⁻¹⁶⁾. Then it was validated by a jury of five experts in the field of obstetrics and gynecological nursing and the necessary modification was done. The face validity of the tool was calculated based on experts' opinion after calculating content validity index (%) of its items and it was 94.5%.

-**Tool II** was adapted from **Global Library of Women's Medicine and Maternity Guidelines Committee (2021)**.

-**Tool III** was adopted from **Abd Elhakm E. and El bana H (2018)**.

-The reliability of the study tools (tool I and II) were tested using Cronbach's Alpha statistical test analysis, which indicate highly reliability 0.89, 0.86 respectively.

Ethical considerations:

-The purpose of the study was explained to the participant then, their informed consent was obtained.

-Confidentiality and privacy was put into consideration regarding the data collection as well as the intern nursing students' rights to withdraw at any time if desire. The researchers were assured that the nature of the study did not cause any harm for the entire sample and the data will only be used for the purpose of the study.

A pilot study

-A pilot study was carried out on 10% of the total sample (5) intern nursing students who were

excluded from the main study to ascertain the feasibility, applicability, relevance and content validity of the tools as well as to detect any problem peculiar to the statements.

Data collection: data was collected from all intern nursing students who were trained at obstetric department of Tanta University hospital over a period of six months from the beginning of April to September 2021.

The program was conducted through four phases

I. Pre assessment phase

-The intern nursing students who agreed to participate in the study were assessed before implementation of the program, in the presence of the researchers for their socio-demographic characteristics, knowledge regarding the third stage of labor and clinical guidelines for active management of the third stage of labor by a self-report individually using **Tool (I)**.

-The researchers observed intern students' practices and skills regarding clinical guidelines for active management of the third stage of labor using **Tool (II)**.

-Finally **Tool (III)** was used to assess the intern students' self-confidence regarding their practices and skills about clinical guidelines for active management of the third stage of labor using the high fidelity simulation.

II. Planning phase

-**This program aimed to** improve the intern nursing students' competency (knowledge, practice and self- confidence) regarding clinical guidelines for active management of the third stage of labor using the high fidelity simulation. The high fidelity simulation training program included two main parts:

-**Part (1) (theoretical part):** was prepared based on the aim of the training program and the intern nursing students' pre-assessment needs. It was developed by the researchers after reviewing the recent relevant literatures⁽¹²⁻¹⁶⁾. It included two sections; **section one** covered knowledge about definition and duration of the third stage of labor, mechanisms of placental delivery, importance of placental examination, signs of placental separation and complications of third stage of the labor, while **section two** contained the definition, importance and steps of clinical guidelines for active management of the third stage of labor.

-Part (2) (clinical part): included high fidelity simulator (SimMom): It is a birthing simulator, representing a full term pregnant adult woman and providing an impactful simulation toolkit which can be used to cover all stages of labor. SimMom responds to clinical intervention, instructor control, and pre-programmed scenarios that allow students to practice the clinical guidelines for active management of third stage of labor through using the following simulator's accessories: Inflatable uterus, neonate, placenta attached to umbilical cord, blood tank with capacity of containing up 1500 ml of artificial blood and disposable materials (**collection bag**, oxytocin and 2cc syringe). The software for active management of the third stage of labor scenario was prepared by the researchers based on extensive review of recent and relevant literatures^(18,19) and tested for content validity by a jury of 5 experts in the related field.

III. Implementation phase

-The intern nursing students were divided into ten subgroups; each group contained 5 interns for the purpose of the demonstration and re-demonstration.

-The high fidelity simulation training program was conducted 3 times/week for each subgroup at the Objective Structure Clinical Examination (OSCE) skills laboratory, Faculty of Nursing, Tanta University. It was implemented by the researchers through the following three sessions.

-First session: This session included a brief orientation about the SimMom birthing simulator and its accessories, the learning objectives of the high fidelity simulation training program, sessions and expectations of each session. This session took about thirty minutes.

-Second session: This session included basic knowledge about the third stage of labor covering definition and duration of the third stage of labor, mechanisms of placental delivery, importance of placental examination, signs of placental separation and complications of the third stage of labor as well as definition and importance of the clinical guidelines for active management of the third stage of labor. This session took about one hour.

-Third session: This session included explaining the steps of clinical guidelines for active management of the third stage of labor **as follow:**

step (1): neonatal assessment, **step (2):** administration of a uterotonic drug, **step (3):** umbilical cord clamping and cutting, **step (4):** controlled cord traction, **step (5):** placental examination, **step (6):** uterine massage, **step (7):** inspection of genitalia and blood loss estimation.

-It was followed by simulation training with the pre prepared scenario that was applied for approximately 15 to 20 minutes for each student during this time the intern nursing student was able to apply the clinical guidelines for active management of the third stage of labor as well as re-demonstrate it by using high fidelity SimMom birthing simulator.

-Illustrated handout about the clinical guidelines for active management of the third stage of labor was distributed after implementation of the program as a reference. This session took about two hours.

IV. Evaluation phase

-Intern nursing students' competency (knowledge, practice and self-confidence) regarding clinical guidelines for active management of the third stage of labor was reassessed immediately and one month after implementation of the high fidelity simulation training program using **Tools (I, II and III)**.

-Comparison was done three times pre, immediately and one month post program to determine the effect of high fidelity simulation on intern students' competency regarding clinical guidelines for active management of the third stage of labor.

Statistical analysis of the data : Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using number and percent. Shapiro-Wilk test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean and standard deviation, . Significance of the obtained results was judged at the 5% level.

The used tests were

1 - ANOVA with repeated measures: For normally distributed quantitative variables, to compare between more than two periods or stages.

2 - Pearson coefficient: To correlate between two normally distributed quantitative variables

3 - Friedman test: For abnormally distributed quantitative variables, to compare between more than two periods or stages and **Post Hoc Test (Dunn's)** for pairwise comparisons

4 - Q: Cochran's test: For non-parametric test for binary response variable and Post Hoc Test (Dunn's) for pairwise comparisons

Results

Table (1): Clarifies the socio-demographic characteristics of the studied intern nursing students. It was observed that most of the studied students were female (80%) corresponding to only (20 %) of them were male with a mean age of 23.10 ± 0.97 years. It was also noticed that most of them (88%) were from rural areas.

Table (2): Illustrates the studied intern nursing students' knowledge about the third stage of labor pre, immediately and one month post simulation training program. Referring to definition and duration of the third stage of labor as well as signs of placental separation and the importance of placental examination, the table shows a convergent percent (52 %, 50%, 48% and 52 % respectively) of the studied students answered correctly and completely pre simulation training program. In relation to the mechanisms of placental delivery and the complications of third stage of labor, it was observed that only (8 % and 20 % respectively) of the studied students answered correctly and completely pre simulation training program. On the other hand, a progressive improvement in all knowledge aspects were obvious among the vast majority (98 %, 96 %, 100 %, 92 %, 98 % and 100 % respectively) of them immediately post stimulation training program. Furthermore one month later, sustained retention of knowledge was existed among (90 %, 88 %, 88 %, 86 %, 92 % and 90 % respectively), with a statistically significant difference ($P < 0.001$).

Table (3): Illustrates the intern nursing students' knowledge about the clinical guidelines for active management of the third stage of labor pre, immediately and one month post simulation training program. It was noticed that only (4 %, 6% and 0% respectively) of the studied students

answered correctly and completely pre simulation training program. Conversely, the vast majority (92%, 96% and 100 % respectively) of them gave correct and complete answers immediately after simulation training program. Likewise, one month later (86%, 88 % and 98% respectively) of them retained knowledge, with a statistically significant difference ($P < 0.001$).

Figure (1): Reveals the total knowledge score level among the studied intern nursing students pre, immediately and one month post simulation training program. Although, (62%) of the studied students had low level of knowledge about the third stage of labor and the clinical guidelines for its active management pre simulation training program. Yet, (100 % and 98% respectively) of them had high level of knowledge immediately and one month post simulation training program with a statistically significant difference ($P < 0.001$).

Table (4): Presents the intern students' level of practice about the clinical guidelines for active management of the third stage of labor pre, immediately and one month post simulation training program. It was observed that only (6% and 18% respectively) of the studied students had done the neonatal assessment and uterine massage correctly and completely pre simulation training program. Moreover, none of them (0%) had done the administration of a uterotonic drug, umbilical cord clamping and cutting, controlled cord traction, placental examination, inspection of genitalia and blood loss estimation correctly and completely pre simulation training program compared to (94 %, 96 %, 100 %, 96 %, 90 %, 92% and 92 % respectively) of them had done the neonatal assessment, administration of a uterotonic drug, umbilical cord clamping and cutting, controlled cord traction, placental examination, uterine massage, inspection of genitalia and blood loss estimation correctly and completely immediately after simulation training program. Furthermore, one month later, the percentages were increased to (96 %, 98 % and 96 % respectively) among the studied students regarding neonatal assessment, administration of uterotonic drug and uterine massage. On the other hand, the percentage remains the same (100%) regarding umbilical cord clamping and cutting,

decreases to (92%, 86% and 86 % respectively) among them regarding controlled cord traction, placental examination, inspection of genitalia and blood loss estimation with a statistically significant difference ($P<0.001$).

Figure (2): Portrays the total practice score level about clinical guidelines for active management of the third stage of labor among the studied intern nursing students pre, immediately and one month post simulation training program. Although (98%) of the studied students had unsatisfactory practice regarding the about clinical guidelines for active management of the third stage pre simulation training program. All of them (100 %) had satisfactory practice immediately as well as one month post simulation training program, with a statistically significant difference ($P<0.001$).

Table (5): Shows the percent distribution of the studied intern nursing students regarding their level of self-confidence about clinical guidelines for active management of the third stage of labor pre, immediately and one month post simulation training program. It was observed that, there was

Table (1): Percent distribution of the studied intern nursing students according to their socio-demographic characteristics (N = 50).

| Socio-demographic characteristics of the studied intern nursing students | No. | % |
|--|---------------------|------|
| Sex | | |
| Male | 10 | 20.0 |
| Female | 40 | 80.0 |
| Age | 22.0 - 26.0 | |
| Min. – Max. | 23.10 ± 0.97 | |
| Mean ± SD. | | |
| Residence | | |
| Rural | 44 | 88.0 |
| Urban | 6 | 12.0 |

SD: Standard deviation

a highly statistical significant difference among the studied students' self-confidence between the pre, immediately and one month post simulation training program ($p<0.001$).

Figure (3): Displays a highly significant progress in all domains of self-confidence about clinical guidelines for active management of the third stage of labor among the studied intern nursing students pre, immediately and one month post simulation training program. Although, (70%) of the studied students were mainly unconfident pre simulation training program. Most of them (92 %) reported confident immediately after simulation training program, which was increased to (96 %) one month post simulation training program, with statistically significant difference ($P<0.001$).

Table (6): Demonstrates a highly significant positive correlation between total knowledge, practice and self-confidence scores among the studied intern nursing students pre, immediately and one month post simulation training program.

Table (2): Percent distribution of the studied intern students' knowledge level about the third stage of labor pre, immediately and one month post simulation training program (N = 50).

| Intern students' knowledge about the third stage of labor | The studied intern students' pre and post simulation training program (n=50) | | | | | | Test of Sig. | |
|---|--|------|--------------------------------------|-------|------------------------------------|------|--------------|---------|
| | Pre-simulation training | | Immediately post-simulation training | | One month post-simulation training | | | |
| | N | % | N | % | N | % | Fr | P-value |
| 1- Definition of third stage of labor: | | | | | | | | |
| Incorrect and didn't know | 14 | 28.0 | 0 | 0.0 | 0 | 0.0 | 39.215* | <0.001* |
| Correct and incomplete answers | 10 | 20.0 | 1 | 2.0 | 5 | 10.0 | | |
| Correct and complete answers | 26 | 52.0 | 49 | 98.0 | 45 | 90.0 | | |
| 2-Duration of third stage of labor: | | | | | | | | |
| Incorrect and didn't know | 16 | 32.0 | 0 | 0.0 | 0 | 0.0 | 34.200* | <0.001* |
| Correct and incomplete answers | 9 | 18.0 | 2 | 4.0 | 6 | 12.0 | | |
| Correct and complete answers | 25 | 50.0 | 48 | 96.0 | 44 | 88.0 | | |
| 3- Signs of placental separation: | | | | | | | | |
| Incorrect and didn't know | 13 | 26.0 | 0 | 0.0 | 0 | 0.0 | 41.674* | <0.001* |
| Correct and incomplete answers | 13 | 26.0 | 0 | 0.0 | 6 | 12.0 | | |
| Correct and complete answers | 24 | 48.0 | 50 | 100.0 | 44 | 88.0 | | |
| 4- Mechanisms of placental delivery: | | | | | | | | |
| Incorrect and didn't know. | 33 | 66.0 | 0 | 0.0 | 0 | 0.0 | 78.329* | <0.001* |
| Correct and incomplete answers. | 13 | 26.0 | 4 | 8.0 | 7 | 14.0 | | |
| Correct and complete answers. | 4 | 8.0 | 46 | 92.0 | 43 | 86.0 | | |
| 5- Importance of placental examination: | | | | | | | | |
| Incorrect and didn't know. | 14 | 28.0 | 0 | 0.0 | 0 | 0.0 | 36.077* | <0.001* |
| Correct and incomplete answers. | 10 | 20.0 | 1 | 2.0 | 4 | 8.0 | | |
| Correct and complete answers. | 26 | 52.0 | 49 | 98.0 | 46 | 92.0 | | |
| 6- Complications of third stage of labor: | | | | | | | | |
| Incorrect and didn't know. | 13 | 26.0 | 0 | 0.0 | 0 | 0.0 | 75.984* | <0.001* |
| Correct and incomplete answers. | 27 | 54.0 | 0 | 0.0 | 5 | 10.0 | | |
| Correct and complete answers. | 10 | 20.0 | 50 | 100.0 | 45 | 90.0 | | |

Fr: Friedman test

p: p value for comparing between the studied periods

*: Statistically significant at $p \leq 0.05$

Table (3): Percent distribution of the studied intern nursing students knowledge level about clinical guidelines for active management of third stage of labor pre, immediately and one month post simulation training program (N = 50).

| Intern students' knowledge about clinical guidelines for active management of the third stage of labor | The studied intern students' pre and post simulation training program (n=50) | | | | | | Test of Sig. | |
|--|--|------|--------------------------------------|-------|------------------------------------|------|--------------|---------|
| | Pre-simulation training | | Immediately post-simulation training | | One month post-simulation training | | | |
| | N | % | N | % | N | % | Fr | P-value |
| 1- Definition of clinical guidelines for active management of third stage of labor: | | | | | | | | |
| Incorrect and didn't know | 36 | 72.0 | 0 | 0.0 | 0 | 0.0 | 79.621* | <0.001* |
| Correct and incomplete answers | 12 | 24.0 | 4 | 8.0 | 7 | 14.0 | | |
| Correct and complete answers | 2 | 4.0 | 46 | 92.0 | 43 | 86.0 | | |
| 2. Importance of clinical guidelines for active management of third stage of labor: | | | | | | | | |
| Incorrect and didn't know | 38 | 76.0 | 0 | 0.0 | 0 | 0.0 | 81.882* | <0.001* |
| Correct and incomplete answers | 9 | 18.0 | 2 | 4.0 | 6 | 12.0 | | |
| Correct and complete answers | 3 | 6.0 | 48 | 96.0 | 44 | 88.0 | | |
| 3- Steps of clinical guidelines for active management of third stage of labor: | | | | | | | | |
| Incorrect and didn't know | 48 | 96.0 | 0 | 0.0 | 0 | 0.0 | 99.351* | <0.001* |
| Correct and incomplete answers | 2 | 4.0 | 0 | 0.0 | 1 | 0.2 | | |
| Correct and complete answers | 0 | 0.0 | 50 | 100.0 | 49 | 98.0 | | |

Fr: Friedman test

p: p value for comparing between the studied periods

*: Statistically significant at $p \leq 0.05$

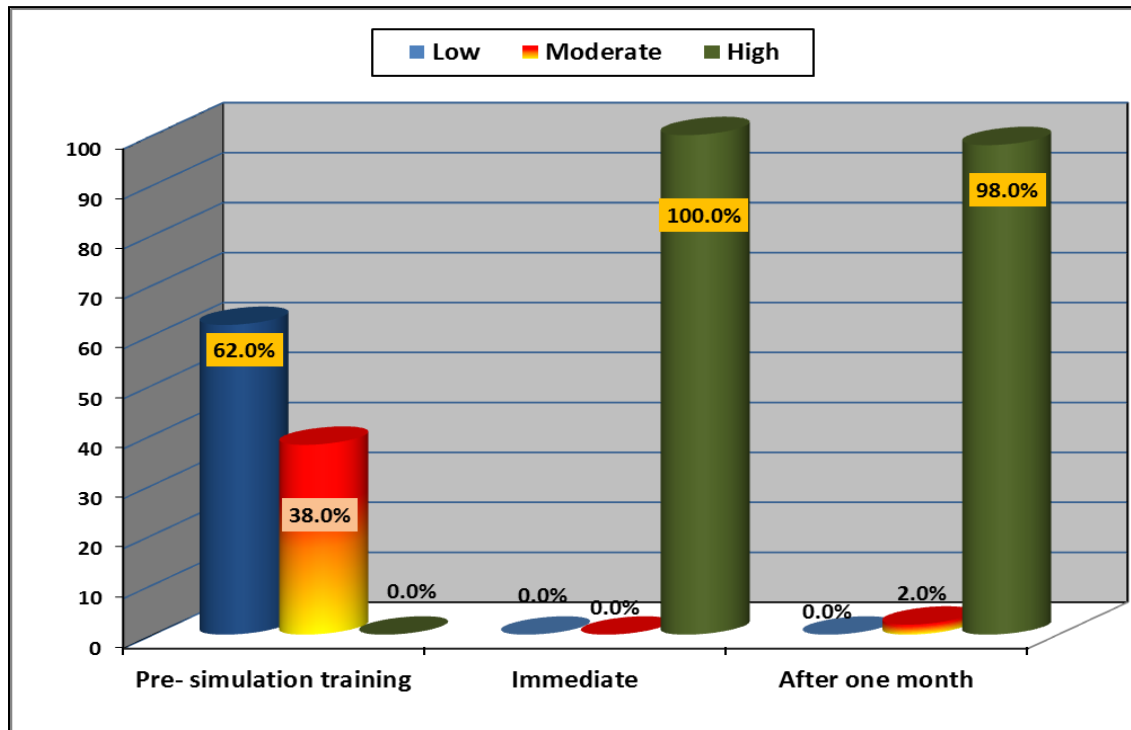


Figure (1): Total knowledge score level among the studied intern nursing students pre, immediately and one month post simulation training program (N = 50).

Table (4): Percent distribution of the studied intern nursing students regarding their level of practice about clinical guidelines for active management of the third stage of labor pre, immediately and one month post simulation training program (N = 50).

| Intern students' level of practice about clinical guidelines for active management of the third stage of labor | The studied intern students' pre and post simulation training program (n=50) | | | | | | Test of Sig. | |
|--|--|------|---------------------------------------|-------|------------------------------------|-------|--------------|---------|
| | Pre-simulation training | | Immediately post- simulation training | | One month post-simulation training | | Fr | P-value |
| | N | % | N | % | N | % | | |
| 1. Neonatal Assessment: | | | | | | | | |
| Incorrect or not done. | 28 | 56.0 | 0 | 0.00 | 0 | 0.00 | 90.795* | <0.001* |
| Correct and incompetently done. | 19 | 38.0 | 3 | 6.00 | 2 | 4.00 | | |
| Correct competently done. | 3 | 6.0 | 47 | 94.0 | 48 | 96.00 | | |
| 2. Administration of a uterotonic drug : | | | | | | | | |
| Incorrect or not done. | 35 | 70.0 | 0 | 0.0 | 0 | 0.0 | 98.052* | <0.001* |
| Correct and incompetently done. | 15 | 30.0 | 2 | 4.0 | 1 | 2.0 | | |
| Correct Competently done. | 0 | 0.0 | 48 | 96.0 | 49 | 98.0 | | |
| 3. Umbilical cord clamping and cutting : | | | | | | | | |
| Incorrect or not done. | 26 | 52.0 | 0 | 0.00 | 0 | 0.00 | 100.000* | <0.001* |
| Correct and incompetently done. | 24 | 48.0 | 0 | 0.00 | 0 | 0.00 | | |
| Correct Competently done. | 0 | 0.0 | 50 | 100.0 | 50 | 100.0 | | |
| 4. Controlled cord traction: | | | | | | | | |
| Incorrect or not done. | 38 | 76.0 | 0 | 0.0 | 0 | 0.0 | 94.929* | <0.001* |
| Correct and incompetently done. | 12 | 24.0 | 2 | 4.0 | 4 | 8.0 | | |
| Correct competently done. | 0 | 0.0 | 48 | 96.0 | 46 | 92.0 | | |
| 5. Placenta examination: | | | | | | | | |
| Incorrect or not done. | 29 | 58.0 | 0 | 0.0 | 0 | 0.0 | 86.484* | <0.001* |
| Correct and incompetently done. | 21 | 42.0 | 5 | 10.0 | 7 | 14.0 | | |
| Correct competently done. | 0 | 0.0 | 45 | 90.0 | 43 | 86.0 | | |
| 6. Uterine massage: | | | | | | | | |
| Incorrect or not done. | 15 | 30.0 | 0 | 0.0 | 0 | 0.0 | 69.725* | <0.001* |
| Correct and incompetently done. | 26 | 52.0 | 4 | 8.0 | 2 | 4.0 | | |
| Correct Competently done. | 9 | 18.0 | 46 | 92.0 | 48 | 96.0 | | |
| 7. Inspection of genitalia and blood loss estimation: | | | | | | | | |
| Incorrect or not done. | 34 | 68.0 | 0 | 0.0 | 0 | 0.0 | 79.353* | <0.001* |
| Correct and incompetently done. | 16 | 32.0 | 4 | 8.0 | 7 | 14.0 | | |
| Correct Competently done. | 0 | 0.0 | 46 | 92.0 | 43 | 86.0 | | |

Fr: Friedman test *: Statistically significant at $p \leq 0.05$
: p value for comparing between the studied perio

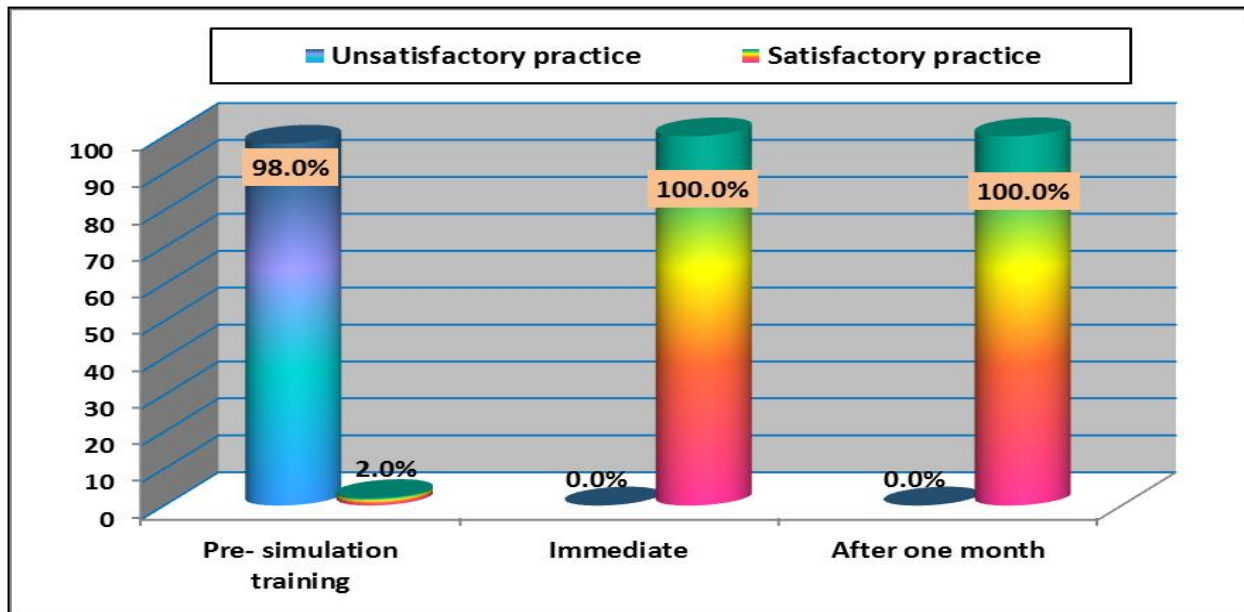


Figure (2): Total practice score level about clinical guidelines for active management of the third stage of labor among the studied intern nursing students pre, immediately and one month post simulation training program (N = 50)

Table (5): Percent distribution of the studied intern nursing students regarding their level of self-confidence about clinical guidelines for active management of the third stage of labor pre, immediately and one month post simulation training program (n= 50).

| Modified Self-confidence Measurement Scale | The studied intern students' pre and post simulation training program (n=50) | | | | | | Test of Sig. | |
|---|--|------|--------------------------------------|------|------------------------------------|------|--------------|---------|
| | Pre-simulation training | | Immediately post-simulation training | | One month post-simulation training | | | |
| | N | % | N | % | N | % | Fr | P-value |
| 1- I am confident that I am mastering the content of training activity: | | | | | | | | |
| Strongly disagree | 16 | 32.0 | 2 | 4.0 | 0 | 0.0 | 66.326* | <0.001* |
| Disagree | 29 | 58.0 | 7 | 14.0 | 5 | 10.0 | | |
| Agree | 5 | 10.0 | 41 | 82.0 | 45 | 90.0 | | |
| 2- I am confident that the training covered critical content: | | | | | | | | |
| Strongly disagree | 10 | 20.0 | 1 | 2.0 | 0 | 0.0 | 63.372* | <0.001* |
| Disagree | 32 | 64.0 | 4 | 8.0 | 3 | 6.0 | | |
| Agree | 8 | 16.0 | 45 | 90.0 | 47 | 94.0 | | |
| 3- I am confident that I am developing skills and obtaining the required knowledge: | | | | | | | | |
| Strongly disagree | 16 | 32.0 | 0 | 0.0 | 0 | 0.0 | 75.221* | <0.001* |
| Disagree | 26 | 52.0 | 3 | 6.0 | 2 | 4.0 | | |
| Agree | 8 | 16.0 | 47 | 94.0 | 48 | 96.0 | | |
| 4- My instructors used helpful resources to teach this simulation: | | | | | | | | |
| Strongly disagree | 17 | 34.0 | 2 | 4.0 | 2 | 4.0 | 50.045* | <0.001* |
| Disagree | 22 | 44.0 | 8 | 16.0 | 3 | 6.0 | | |
| Agree | 11 | 22.0 | 40 | 80.0 | 45 | 90.0 | | |
| 5-It is my responsibility as the student to learn what I need to know from this method of training : | | | | | | | | |
| Strongly disagree | 12 | 24.0 | 3 | 6.0 | 2 | 4.0 | 46.536* | <0.001* |
| Disagree | 30 | 60.0 | 9 | 18.0 | 6 | 12.0 | | |
| Agree | 8 | 16.0 | 38 | 76.0 | 42 | 84.0 | | |
| 6- I know how to get help when I do not understand the concepts covered in the simulation: | | | | | | | | |
| Strongly disagree | 10 | 20.0 | 4 | 0.8 | 1 | 0.2 | 29.967* | <0.001* |
| Disagree | 23 | 46.0 | 6 | 12.0 | 4 | 0.8 | | |
| Agree | 17 | 34.0 | 40 | 80.0 | 45 | 90.0 | | |
| 7- I know how to use simulation activities to learn critical aspects of these skills: | | | | | | | | |
| Strongly disagree | 20 | 40.0 | 3 | 6.0 | 1 | 2.0 | 69.887* | <0.001* |
| Disagree | 25 | 50.0 | 3 | 6.0 | 3 | 6.0 | | |
| Agree | 5 | 10.0 | 44 | 88.0 | 46 | 92.0 | | |

Fr: Friedman test p: p value for comparing between the studied periods *Statistically significant at $p \leq 0.05$

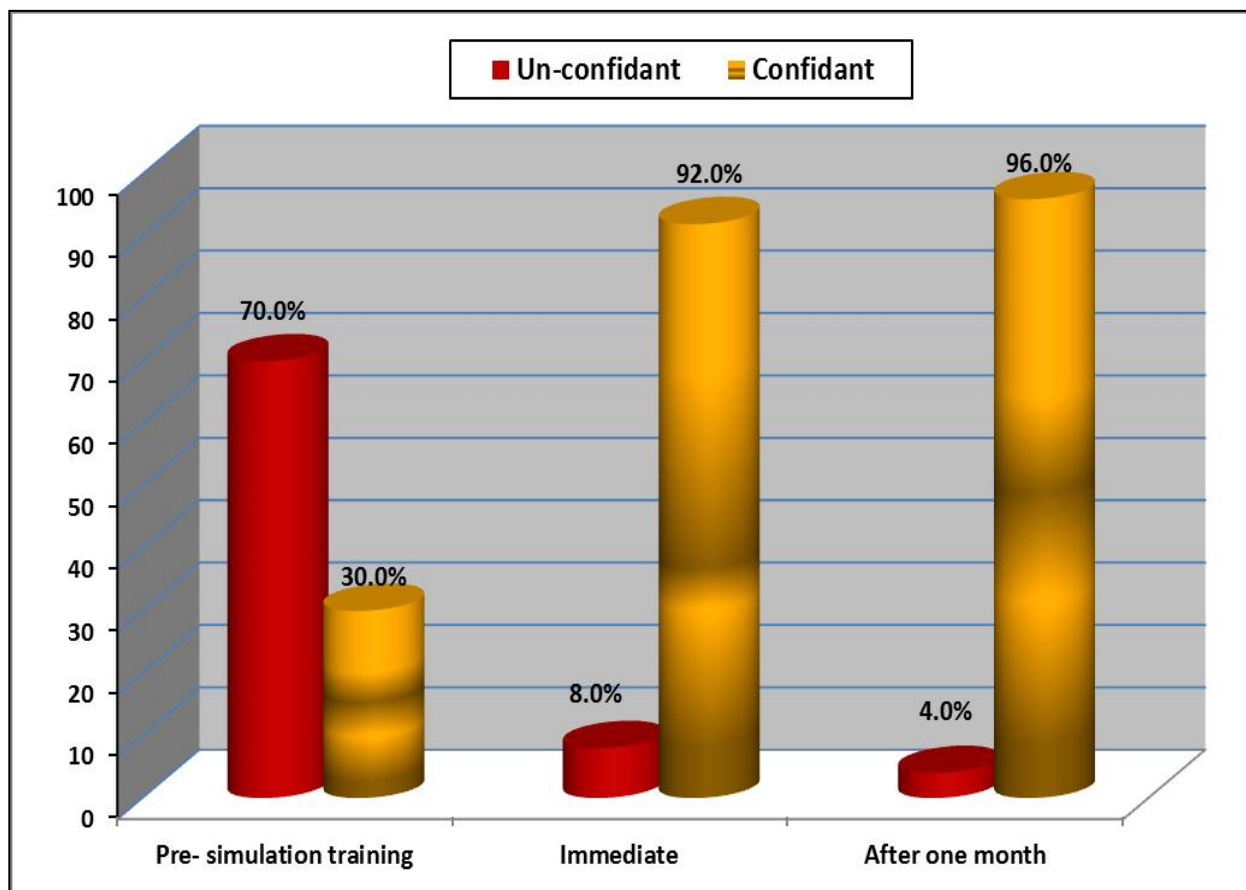


Figure (3): Total self- confidence score level about clinical guidelines for active management of third stage of labor among the studied intern nursing students pre, immediately and one month post simulation training program (n=50).

Table (6): Correlation between the total knowledge, total practice and total self-confidence pre, immediately and one month post simulation training program among studied intern nursing students (N = 50).

| Correlations | The studied intern nursing students' pre and post simulation training (n=50) | | | | | |
|--------------------------------------|--|---------|---------------------------------------|---------|-------------------------------------|---------|
| | Pre- simulation training | | Immediately post- simulation training | | One month post- simulation training | |
| | r | P | R | P | R | p |
| Knowledge Vs. Practice | 0.282* | 0.047* | 0.476* | <0.001* | 0.421* | 0.002* |
| Knowledge Vs. Self-confidence | 0.958* | <0.001* | 0.903* | <0.001* | 0.842* | <0.001* |
| Practice Vs. Self-confidence | 0.329* | 0.020* | 0.639* | <0.001* | 0.658* | <0.001* |

r: Pearson coefficient

*: Statistically significant at $p \leq 0.05$

Discussion

Third stage of labor is considered as a critical period. When the uterus fails to contract effectively after birth, this will lead to postpartum hemorrhage, which is one of the top five causes of maternal mortality worldwide. Therefore, implementation of clinical guidelines for active management of the third stage of labor can be a lifesaving intervention. Main health care providers who are responsible for applying it are intern nursing students. Hence, strengthen their skills through effective training is essential. High fidelity simulation training provides a safe environment for intern nursing students to manage real life emergency situations, increase their ability to work under pressure as well as promote their self-confidence overtime.

The result of the current study declared that there was a statically significant difference between the intern nursing students' knowledge about the third stage of labor pre, immediately and one month post simulation training program. This result is in agreement with **Ibraheem E. et al., (2018)**⁽²⁶⁾ who investigated “Nursing care of the third and fourth stages of labor: protocol of care” and stated that there was a highly statistically significant difference between nurses knowledge regarding third stage of labor pre and post intervention. This agreement can be attributed to the effectiveness of the training for improving the nurses' knowledge.

At the same time, the findings of the present study reported that there was an evident increase in the intern nursing students' knowledge about the clinical guidelines for active management of the third stage of labor immediately and one month post simulation training program than pre-program. This finding was supported by **Angelina J. et al., (2021)**⁽²⁷⁾ who researched “The impact of low fidelity simulation on nurse competency in active management of third stage of labor”, they concluded that overall knowledge on active management of third stage of labor was significantly improved after simulation training. This similarity can be supported by the literatures that emphasizes on the ability of simulation training program on bridging the gap between theory and clinical practice.

Concerning the total knowledge score level among the studied intern nursing students pre,

immediately and one month post simulation training program, the present study revealed a significant sustainable improvement in the total knowledge score level immediately and one month post simulation training program compared to preprogram. This finding was matching with **Zaky N., (2017)**⁽²⁸⁾ who evaluated “Effect of a medium fidelity simulation based training on nurses' knowledge, performance and clinical judgment of postpartum hemorrhage management”, she reported that there was astonishing significant improvement in the acquisition and retention of knowledge among the study group after implementation of simulation training. Additionally, **Mccooy T., (2018)**⁽²⁹⁾, endorsed the use of maternal and newborn high fidelity simulation to improve knowledge of undergraduate nursing students.

In the same line, **AbdElhakm E. and Elbana H., (2018)**⁽²⁵⁾, who elaborated “Effect of simulation based training on maternity nurses' performance and self-confidence regarding primary postpartum hemorrhage management”, found that there was a highly statistically significant difference in knowledge between the pre and post intervention phases. Again, the present study findings were in agreement with **Pansuwan K. and Klankhajhon S., (2021)**⁽³⁰⁾ who studied “The effect of using simulation based learning on nursing performances of early postpartum hemorrhage in nursing student” and concluded that simulation based learning improve nursing students' knowledge. These findings evident that the nursing students' ability to retain sustainable knowledge improved by high fidelity simulation training.

As regard the total practice score level about clinical guidelines for active management of the third stage of labor among the studied intern nursing students pre, immediately and one month post simulation training program, the present study showed that there was a significant improvement in the total practice score level immediately and one month post simulation training program than pre-program. This finding was in accordance with **AbdElhakm E. and Elbana H., (2018)**⁽²⁵⁾, **Karadas M. and Terzioglu F., (2019)**⁽³¹⁾, and **Hernandez E. et al., (2021)**⁽³²⁾, they reported that high fidelity

simulation significantly improve nurses practice regarding postpartum hemorrhage management from before to after simulation training. Moreover, **Pansuwan K. and Klankhajhon S., (2021)⁽³⁰⁾** endorsed the use of simulation based learning on nursing performances of early postpartum hemorrhage in nursing student. In addition, **Changuiti O. et al., (2021)⁽³³⁾**, confirmed that high fidelity simulation significantly increased midwifery students practice. From the researchers point of view high fidelity simulation is a highly effective training method for improving nurses' practice as it put them in real situation.

Considering the total self- confidence score level about clinical guidelines for active management of the third stage of labor among the studied intern nursing students pre, immediately and one month post simulation training program, the present study displayed a highly significant progress in all domains of self-confidence among the studied intern nursing students immediately and one month post simulation training program compared to pre-program. This findings went hand in hand with **Abisogun E., (2018)⁽³⁴⁾**, and **Abdelhakm E. and Elbana H., (2018)⁽²⁵⁾**, who portrayed that there was a significant difference between nurses' self-confidence at pre and post simulation training. Similarly, **Yu J. et al., (2021)⁽³⁵⁾**, found that nursing students had a significantly higher self-confidence after high fidelity simulation based training program. The harmony of previous studies with the present study may be aroused from the fact that simulation based experience results in decreasing the associated fears of failure with actual patients.

On the subject of correlations between the total knowledge, total practice and total self-confidence pre, immediately and one month post simulation training program among studied intern nursing students. The current study demonstrated a highly

significant positive correlation between total knowledge, practice and self-confidence scores among the studied intern nursing students. These findings were supported by **Abdelhakm E. and Elbana H., (2018)⁽²⁵⁾**, who reported that there was a highly significant positive correlation between total knowledge, practice and self-confidence scores among maternity nurses post simulation based training. In congruence with these findings **Bhutia S. et al., (2018)⁽³⁶⁾**, reported that there was a positive correlation between knowledge and practice of active management of third stage of labor among nursing students. From the researchers point of view these findings attributed to the ability of high fidelity simulation to put the students in real like situation, which allows demonstration and re-demonstration, subsequently increasing the competency of the students' practice that is required for developing self-confidence. **Conclusion**

Based on the findings of the present study, it can be concluded that high fidelity simulation training significantly improve the intern nursing students' competency (knowledge, practice as well as the self-confidence) regarding clinical guidelines for active management of the third stage of labor.

Recommendations

- Implementation of high fidelity simulation training regarding clinical guidelines for active management of the third stage of labor among larger sample and other setting.
- Provide pre-service and in-service training programs using high fidelity simulation especially for newly appointed intern nurses to improve their knowledge and practices as well as the self-confidence.
- High fidelity simulation training as a method of education should be included in nursing curriculum to increase nurses' knowledge and practices as well as their self-confidence.

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